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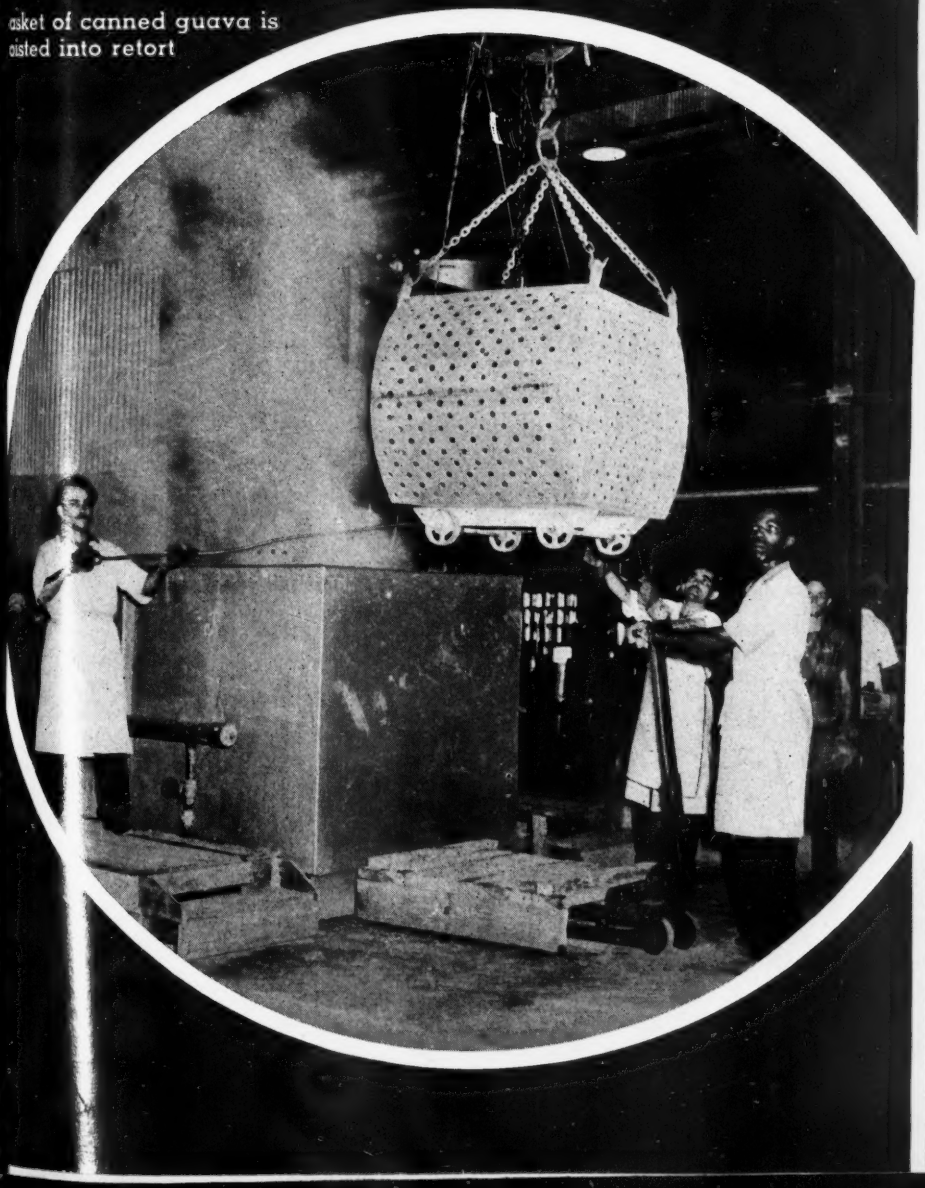
FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



asket of canned guava is
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APRIL 1945

How Will You Build Your Postwar Plant?

Guava — A New Vitamin C Material

New Zealand Dries Butterfat

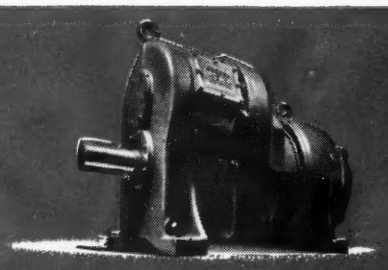
Wax Coating Keeps Fruits Fresh

Food Plant Safety Made Practical

New Findings on Potato Blanching

Rolling-Rod Mill Passes WPB Tests

McGRAW-HILL PUBLICATION



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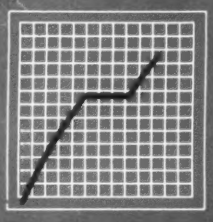

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THE COVER

In the plant of American Tropical Products Corp., at Colon, Cuba, guava is packed in No. 10 tins for shipment to food processors in this country. The cover picture shows a basket of canned guava puree being hoisted into an open water retort for heat processing. This tropical fruit has been used to enrich foods for the armed forces, since it has a very high and stable vitamin C content. For details see article on page 74.

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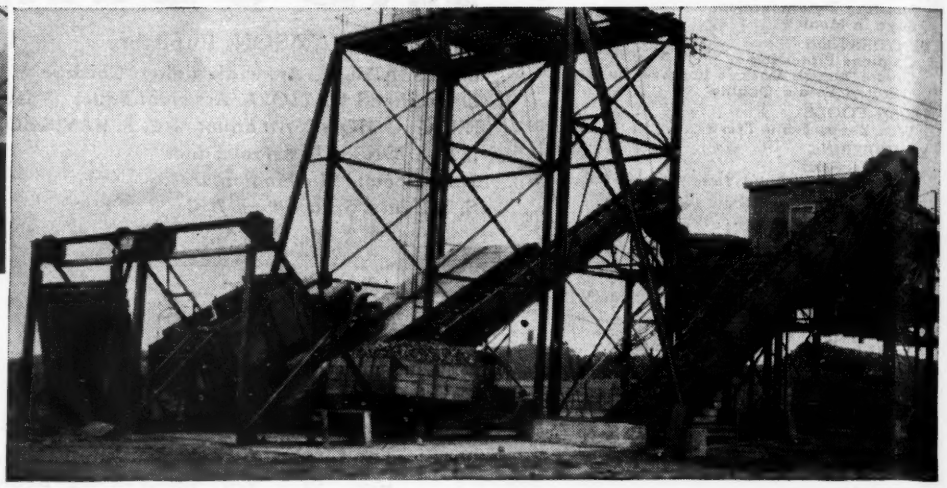
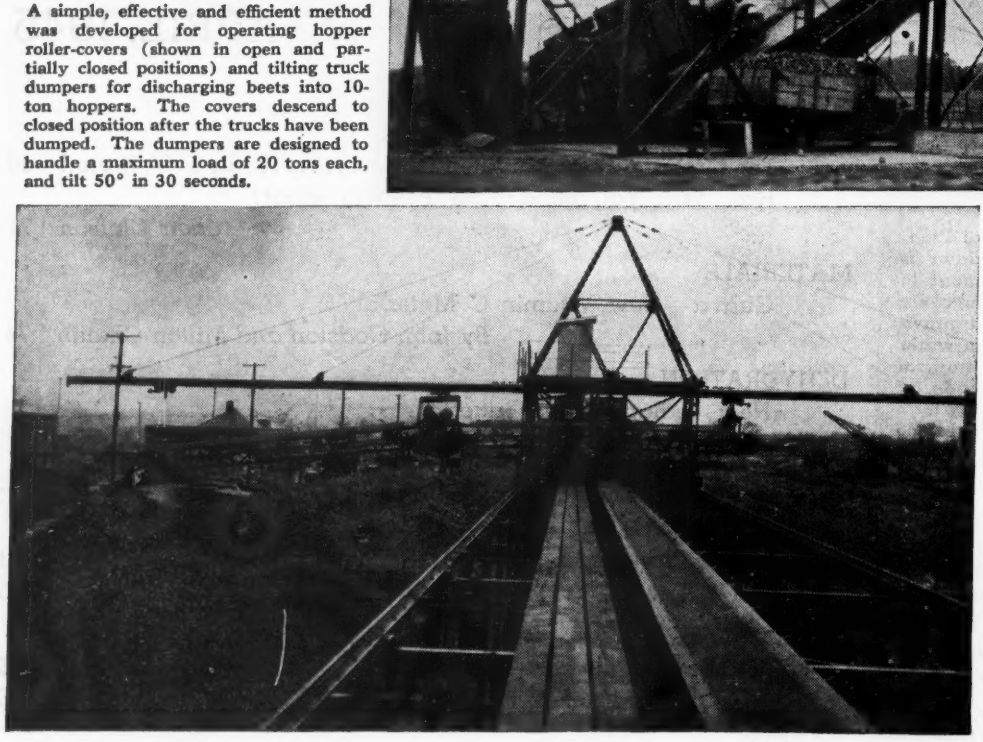
Here's How Monitor Sugar Co. Handles Sugar Beets Efficiently and Economically with LINK-BELT DUMPERS *and* CONVEYORS



A simple, effective and efficient method was developed for operating hopper roller-covers (shown in open and partially closed positions) and tilting truck dumpers for discharging beets into 10-ton hoppers. The covers descend to closed position after the trucks have been dumped. The dumpers are designed to handle a maximum load of 20 tons each, and tilt 50° in 30 seconds.



▲ View shows one truck dumped and another one ready to be dumped. The bottom of each hopper is fitted with a reciprocating, self-cleaning feeder which discharges to a 30" wide apron conveyor for delivering beets to a screen removing dirt. Clean beets are discharged to foot end of 650-ft. long main belt conveyor.

◀ This unique traveling cantilever bridge is equipped with a 68-ft. shuttle belt conveyor boom which is hinged in the exact center and is so arranged that either end may be raised or lowered when beets are placed into storage, thus preventing serious damage to beets which otherwise would be subjected to a long drop.

● The unloading and storing of sugar beets at the Monitor Sugar Co., Bay City, Mich., is an example of modern equipment doing a vital job with efficiency and economy.

Link-Belt engineers designed the handling system, incorporating many features which resulted from solving all types of handling problems for nearly 70 years. It consists of two truck dumpers with roller-type hopper covers; two 10-ton dump hoppers with reciprocating feeders; two apron conveyors; two beet screens with dirt collecting hoppers; a 36" wide belt conveyor on 650-ft. centers; a traveling cantilever bridge supporting a 68-ft. centers shuttle belt conveyor boom designed to handle 400 tons of beets per hour. The installation has been in service since 1938 and is giving very satisfactory performance.

If you have a conveying or a power transmission machinery problem, consult with Link-Belt engineers. Their knowledge and experience are at your service.

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The Growing Food Muddle

THE bad news is out at last. Official Washington now admits what every housewife has known for some time. Food is becoming scarcer. The President reluctantly admits that it is a matter of national decency to help feed the starving abroad and that we may have to tighten our belts.

Congress has ordered several investigations of "What has happened to America's food?" James F. Byrnes has appointed an interagency committee to see that our economy does not break down by exporting too much food, and other items.

E. P. Hawk, Bureau of Foreign and Domestic Commerce, calls for home canning in a big way. So does WFA, which also announces that poultry supplies will be reduced 5½ lb. per capita from 1944 consumption. WFA also cancels a previous request for an 18 percent reduction in egg production, and now calls for as many eggs as were produced last year. Butter production is declining, and WFA estimates that we shall have 10.5 lb. per capita, compared with 11.8 lb. last year. (There is, however, plenty of butter for those who have the red points.)

Per capita meat supply will be about 127 lb. (perhaps even less) compared with 1944's 147 lb., down 20 lb., or more. But there is an oddity in the situation here. Commercial interests are advising cattle men to get back to the cattle population of 1943 by the slaughter of an extra 6,000,000 head, which is (or was) also the government's goal. Purpose of this move is to decrease livestock holdings while the market is still high so that feed and livestock loans may be paid off. While additional slaughter will increase the amount of meat, it will also reduce the animal supply.

Lard stocks are down to the vanishing point. Industrial use of sugar is to be curtailed still further. Government set-aside orders for rice amounts to about 6,000,000 bags out of an expected 9,000,000-bag crop, presumably largely for the Philippines. Potatoes have been disappearing so rapidly in the first quarter that the early 1943 shortage may be repeated.

While there is seemingly more than enough wheat in the United States to take care of our needs, the slow-down of transportation has had a bad effect and local shortages actually have existed in this country.

This is not all that can be said about the bearish factors in our 1945 food supply. Farm employment on March 1 totaled 8,400,000, the lowest figure for that date in 21 years. The decline in hired hands during the past 12 months is about 6.5 percent.

Our stockpile of tin is very low, and imports of this strategic metal are only 25 percent of our needs. Thin-gage steel for tin can manufacture has been reduced to 591,000 tons of prime steel plate from the 700,000 tons asked for by the can makers.

Overseas Demand Increasing

Unhappily, there is much more to be said about the demands for food from our diminishing resources. There is no need to repeat here the effect of the drought in the Southern Hemisphere that has had the effect of curtailing the food supply for our troops in the Pacific and also of cutting down the meat supply available for shipment from Australia to Great Britain. On top of these, the United States has recently decided to cut off roughly 90 percent of our Lend-Lease exports of meat to Britain, which has posed a further food problem of major magnitude for our Ally.

I am sorry to note that not a few Americans (some in high government positions) were crying surplus not long ago and warning of impending overproduction without giving any thought to the huge numbers of people to be fed overseas if we are to win the peace as well as the war. Some of the nations have the money to pay for food imports. Those who still cling to the surplus notion are doubtless due for some practical education in the coming few months. A single straw in the wind is General Eisenhower's recent demand for enormous quantities of flour, quantities so large that well-informed members of the milling industry state that there is not a chance to deliver the amounts specified within a reasonable time.

Britain has shipped much of her food reserves to the Continent, believing that we could keep her supplied. Nearly half of Holland's farms are ruined. Belgium is in chaos. France is hungry. North Africa is now a food deficit area. Everywhere that we have liberated peoples from Axis domination we have worsened, not bettered their lot. That is not the way to win the peace.

The investigations by the several Congressional committees will reveal that our own food resources are limited and by no means equal to the demand. Congress also will learn of our insufferable muddling. It is to be hoped that out of their findings will come a little more common sense in the handling of what may become a world-wide famine.

Three years ago they said that "Food will win the war and make the peace." One hopes that we still can make good the last part of that slogan.

L. V. Burton EDITOR

The Talk of the Industry

• OUT Cleveland-way last month, a public utility official remarked that his business was getting to be more and more like the food business. With the biggest sales volume his company has ever known, the profits were very modest.

• W. K. WRIGLEY CO.'S wartime business has reached such a pass that it is now advertising an empty chewing gum wrapper (for the duration).

There's an idea for other manufacturers. Why shouldn't the butter manufacturers feature empty butter cartons (for the duration)? Ditto for cigarettes. Meat packers? Well, that seems to be the $64 question.

• WFA, WMC, WPB, OPA, and USDA usually take up so much of our time that we have been forced to neglect the U. S. Department of Commerce. Thus you have been deprived of two observations gleaned from "Survey of Current Business."

Under *Employment Conditions and Wages in Food and Kindred Products*, the department has only three subdivisions: Baking, Canning and Preserving, and Slaughtering and Meat Packing. Question: Where are the kindred products? Tobacco manufacturers is listed separately from F&KP.

But among *Foodstuffs and Tobacco* statistics is found Distilled Spirits and Whiskey which, as you may have "heared tell," are chemicals.

All of which goes to show that the USDC is not one to disagree with USDA's inclusion of fish canning with agricultural pursuits.

• COMMON SENSE must ever rule the decisions of management. Some subordinates seem to believe, however, that important decisions can be pulled out of thin air. Or pulled out the hat, like the magician's rabbit, little realizing that the rabbit must first be there before it can be extracted. For example, every little while some reader writes to this office that we should keep politics out of this magazine.

We should like to inquire whether the food processing industry operates in a political vacuum. Or is the professional food technologist in a class of human beings far above the influence of man-made laws? Or is it that these pages have unwittingly been made so sacrosanct that the mere mention of the economic theories of the party in power constitutes a violation of technological decency? About all that can be said in reply to the person who protests that matters political are quite outside the intellectual scope of a reader of these pages is that he lacks a clear understanding of what constitutes politics.

The true meaning of politics is that it is the art of government.

If the time ever comes when the food processing industry is wholly unaffected by the decisions of government, then there will be no further occasion to mention them. But as long as there is an economic impact on the industry by the laws and regulations imposed on all of us by the party which temporarily has the majority of the votes of the body politic, just so long will these pages have comments to make on them.

Hors d'Oeuvres

• Originating in France nearly four centuries ago, the White Calville apple has been found to be almost as rich in vitamin C as the orange. It is juicy, of delicate flavor and good either fresh or cooked. But it looks sour from where the citrus boys sit.

• *Riboflavin contained in enriched flour increases the reproductivity of the flour beetle by 70 percent, a high-frequency biological phenomenon which disturbs the bakers and millers no end. Whoever would have thought that sex problems would enter into the work of the food technologist?*

• Britain's Food Minister Llewellin reports that England's food supply was all right until the Allies started liberating so many people whose food requirements have to be met from stocks in Britain. So V-E Day will catch the English with their stocks down.

• *April 28 to May 15 is 7th Annual Baby Week. Which may suggest something to you in the way of promotional approach.*

• This column recently mentioned claims that there isn't a squirt in a carload of Western desert-grown grapefruit. Now comes this cutting comment from a good Texan. "Sure there isn't a squirt in a carload. It takes juice to make a squirt. Try some of our pink grapefruit from the Lower Rio Grande Valley and see the world through rose-colored glasses." Well, seein' as how we're a Hoosier, reckon we'll jus' stick to tomater juice.

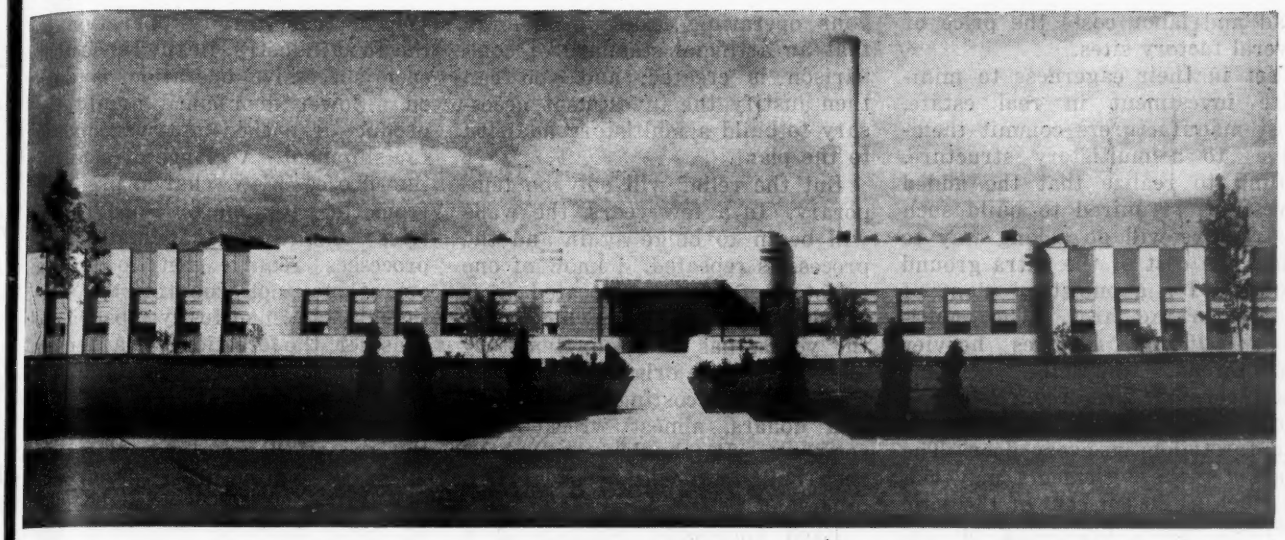
• *Upwards of three million young married couples will be setting up kitchen operations when the husbands return from the armed forces. Which will mean just that many more inexperienced cooks who will need the carefully prepared products of the food processor.*

• The director of New Hampshire's fish and game department suggests a porcupine meat business as a new project for returning soldiers—a suggestion with some point. All they will need, he says, is a fancy name for the product—like, say, barby cue pig.

• *Andreas Marggraf, professor of physics at the Berlin Academy of Science, first obtained sugar crystals from beets in 1747. Fifty years later, Napoleon and Frederick William of Prussia fostered commercial production. It also was Bonaparte who put the push behind the development of canning. Processed foods seem to have been among the first successful secret weapons.*

• Nestorian monks at the mouth of the Euphrates in India are believed to have developed the art of refining cane sugar about the year 600. So food technology is not exactly a new development.

F. K. L.



The one-story Rochester plant of the Harold H. Clapp Division of American Home Foods, Inc., shows important operating economies as compared with other plants which are multistory

How Will You Build YOUR POSTWAR PLANT?

Can you afford gravity flow? How much will you pay in operating expenses and manpower for those upper stories? What will happen when operating departments expand? Multistory factories cost too much to build, too much to operate

By FRANCIS CHILSON, Industrial Consultant, New York, N. Y.

BEFORE discussing in detail the factors which make a plant efficient or inefficient I would like first to epitomize my conception of an ideal plant and then tell you why I think such a plant will fulfill your postwar needs.

The postwar plant will be designed for operating efficiency. It will be a one-story structure, with 15 to 20 ft. of clear internal headroom to permit high stacking with tiering trucks, to house large units of equipment and for tiering processing equipment.

It should, of course, have a siding and it will be at car-door height, throughout its entire length, to permit direct loading and unloading from cars and trucks. It will have lots of enclosed truck-dock space, as this preserves heat in winter, protects against rain and can be used at night for truck garages. Paralleling the railroad siding, a covered shipping platform will speed loading and unloading. A double-end siding will allow the loading to proceed while switching is in progress.

Then, since the siding will form a natural starting point for expansion, future growth will be planned to go in at least one direction along the railroad track and also at right angles to it for the entire length of the building.

Because the siding acts as a barrier to expansion, all fixed facilities such as toilets, washrooms, shops, laboratories, locker rooms and other service areas will be located on the railroad side, preferably next to the packaging and manufacturing departments which occupy the center of the long rectangular building. At its extremities will be the warehouses.

The building area will be apportioned for raw materials and packaging materials warehouses, the manufacturing and the packaging divisions, finished stock warehouse and shipping department. But there will be no physical barriers to reassignment of the space as may be required by any future needs of these divisions. Equipment for water treatment, air conditioning, ventilation, fume and dust removal will be on the roof.

Why One Story?

A single-story structure will require a lot more ground space in the beginning and, later, to allow for expansion. It is at this point, especially in urban localities where all land is expensive, that most manufacturers make the mistake of economizing on ground investment. Right here let it be said that the initial cost of ground and the cost of construction are by no means as important as are the future operating costs. If, in order to economize on land investment, you unconsciously commit yourself to the construction of the wrong type of building, you will forever peg your basic operating costs at a high level. In the course of the 50-year life of a factory building you may well absorb in higher over-

head and labor costs the price of several factory sites.

Yet in their eagerness to minimize investment in real estate, most manufacturers commit themselves to a multistory structure, failing to realize that the added investment required to build such a structure will go a long way to offset the cost of the extra ground required for a one-story plant of equal working area. The multistory building requires heavier foundations, sidewalls, columns and floors: It also requires space for elevators, stairs, fire escapes and for toilets on every floor. The space for these elements may run as much as 20 per cent of the total enclosed space, depending on the height of the building and the floor loading. In one six-story heavy industrial building recently surveyed by the writer, the loss of enclosed space throughout the building, due to heavy columns, stairs, elevators and so on, is almost the exact equivalent of the net available space on one floor.

When the Business Grows

What invariably happens in a multistory structure is that the enclosed space is divided among several "departments" which may or may not be confined each to one floor. In the beginning, some extra space is allotted, wastefully, to each department to take care of future expansion, or else warehouse areas are sandwiched between operating departments. In the latter case, as a department expands it absorbs the warehousing space, and the material to be stored is shoved somewhere else without regard to the extra materials handling involved.

Eventually a time is reached when no more space for expansion is available. What then? The plant begins to disintegrate.

The basic difficulty is that the need for expansion is never felt on all floors simultaneously. Usually it occurs on one or the other of the upper floors—and you can't shove a third or fourth story out into the air without something to hold it up.

Since at the time when you need space on the upper floors you will not need it on other floors, you cannot justify the expense of new building. You will shuffle departments around and create subdivisions, with increased supervisory and material handling costs. You may rent outside warehousing space. At last you will have built your operating costs up so high that an artificial standard of comparison is created, and you can then justify the investment necessary to build a multistory addition to the plant.

But the relief will only be temporary. In a few years, the walls will begin to bulge again and the process is repeated. I know of one ten-story food plant located in a highly populous center which, over the years, has had four ten-story additions to the original plant. The last addition, costing several million dollars, almost wrecked the company. It should never have been built, and neither should the others.

Each successive addition in a growing urban locality entails successively higher land costs, higher building costs and higher taxes, as well as higher priced labor. The wonder of business is that so many manufacturers can do so many fool things and still stay in business, even at a diminishing profit ratio, never realizing that their decisions with respect to plant operations have all been wrong.

The correcting, as far as is possible, of the inherent errors in multistory manufacturing operations has been my business for years, wherefore I should be fond of multistory factory buildings. But I am not. I hate waste, and I am beginning to tire of correcting the blunders of architects, builders and manufacturers of little vision. Hence this article.

What the manufacturer gets, when he selects a multistory building, is a too costly, but possibly imposing looking, edifice and whatever advantages there may be in gravity flow.

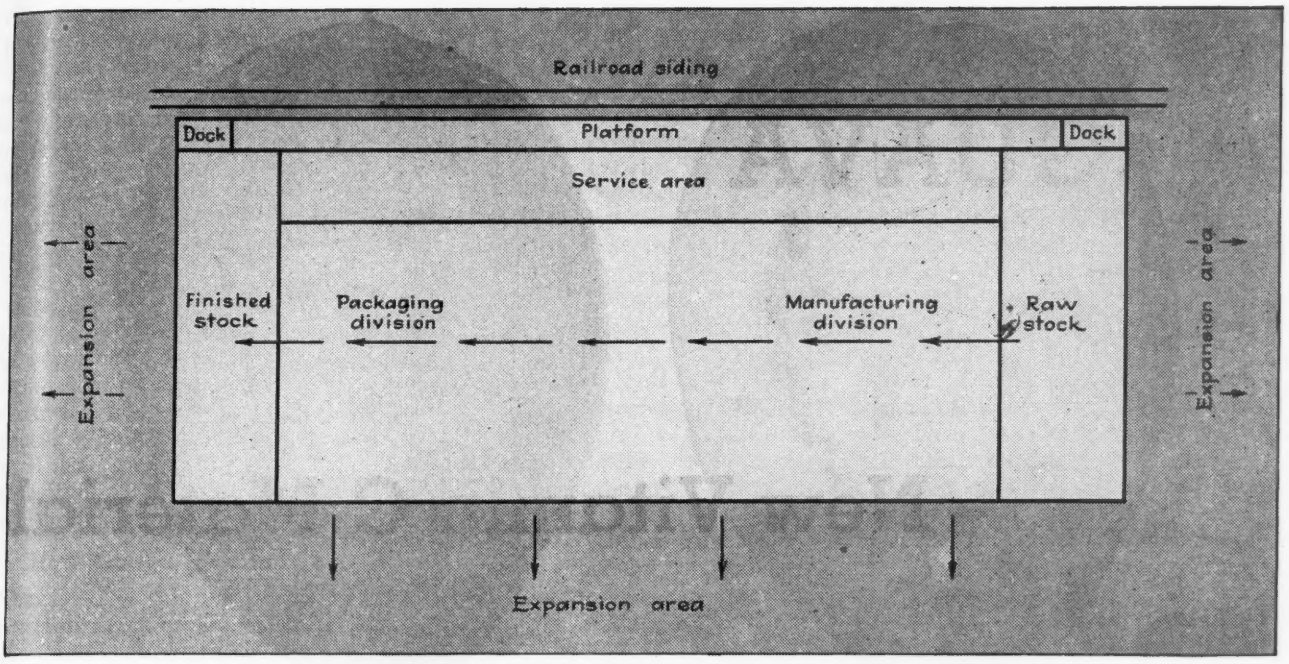
Debunking Gravity Flow

Gravity flow is the most expensive fallacy ever adopted by American manufacturers. "Everything flows by gravity," has a smug narcotic sound. It blunts critical inquiry into the real operating costs and prevents a true conception of the function played by factory structures in determining cost levels. It's too damn bad that gravity doesn't flow *up*, as well as down. I have heard many manufacturers say with pride that everything "starts on the top floor and comes down by gravity," but I've seldom heard one express any interest in how the stuff got upstairs in the first place, so as to start flowing down.

As a matter of fact, I have never seen a true gravity operation in the food industry, in the sense that each successive operation is done on a lower floor until finally the product is packed and warehoused for shipment. A glance at some of the process flow charts prepared from time to time by Food Industries will reveal that many food processes require ten to fifteen operations, not counting packaging. It is manifestly absurd to consider the erection of a ten or fifteen-story building to accommodate such operations (although it has been done). And right here the gravity-flow fallacy blows up and compromises are necessary. If mechanical transport must be used on some floors to confine a ten-phase manufacturing operation to, let us say, four floors, why not confine the entire cycle to one floor, use mechanical handling means throughout and eliminate many difficult problems of labor balance, materials handling, supervision and control at one stroke? Efficient use of labor in a multistory building is a hell of a hard thing to achieve.

Unfortunately, most food manufacturers lack criteria against which to measure production costs. Only when a competitor can undersell him or give better service and still make a profit does the manufacturer realize that his costs are too high. Then he may lay the blame in several directions. Seldom will be attribute it to the influence of the wrong type of plant. Usually he lacks opportunity to compare the cost of identical products made with identical equipment in different types of buildings, so that he may never discover the cause of his higher costs. But the writer has had this opportunity and can prove that the difference in controllable cost—labor and plant overhead—may run as high as 30 percent. In the food business that is a percentage to be reckoned with.

A factory exists only to service sales. Every cent that can be eliminated from costs is a direct contribution to profits and therefore to business success. A factory is not a monument. It is the composite production machine of which all other production machines are parts, and it should always be designed to facilitate the use of equipment, the handling of materials and of labor. In the large view, manufacturing may be broadly defined as a process of handling materials during the course of which



Schematic layout of a one-story plant using straight-line flow, with space for expansion on three sides.

they change from raw to finished products. The building will determine the amount, distance and speed with which materials can be handled in passing from receiving points through processing points into finished goods storage.

Uneconomical Operation

In multistory structures, flow of solid materials depends on elevators in at least one direction, and any elevator transport is intermittent instead of continuous. Chutes and conveyors are not economical. And unit-load transport systems cannot be used to full advantage.

Labor use is unbalanced and excessive because it generally is impossible to allocate exactly the amount of labor required for each phase of the operations on different floors. Frequently it is necessary for operators to shuttle between floors. Supervision is intermittent. A series of stories imposes a physical handicap on the plant superintendent. It is exhausting to be forced to travel up and down stairs several times a day, but most supervisors use the stairs rather than lose time waiting for elevators. A lot of supervisory time is lost in the time between floors.

Other factors affect labor efficiency. Multistory structures of any size suffer from lack of natural light and ventilation, so that lighting and ventilation costs are high. Dust and fume removal require the use of long ducts from operation to discharge points.

One-story Does It

In the single story plant, the flow of materials can be made more or less continuous. Unit-load systems can be used throughout. Virtually all of the enclosed space is usable, excepting the very small amount required for toilets and washrooms. And the space can be used efficiently since there is no need for heavy columns and spans of 50 to 100 ft. can be made.

Supervision and labor conditions are better when the whole show is under constant observation all of the time. Labor can be shifted from operation to operation, department to department, or division to division with ease and dispatch, as required. Discipline is better in large open areas than in small subdivided ones, since there is less tendency for horseplay and shouting. The very volume of noise thus engendered automatically controls itself. Besides, the operators know that they are constantly under the eye not only of the divisional management but of the general management as well. Even sanitary control of workers is improved because centralized toilet areas make it easier to ensure that workers wash their hands properly after making use of toilet facilities.

Single-story construction can provide natural outside lighting, even though the building is several hundred feet wide, by means of skylights or monitors. Ventilation is simplified because wind-operated exhausters can be located all over the roof area. And in the same way, dust and fume removal are simplified because units can be located on the roof directly above the areas of processes involved, without long, dirt-collecting duct work.

Space in the one-story building is completely fluid. The diagram shows the division of space in a typical building laid out for straight-line flow. For U-type flow, service and storage areas are at opposite ends. If these buildings are properly located on their sites, expansion can take place piecemeal as required and departments or divisions can be expanded directly without disintegration of the entire plant.

The point to be remembered is that service departments must be located so that they will never interfere with the expansion of the plant. They may be above or below the operating floor. Thus a two- or three-story section for offices, laboratories and service areas can be placed at some fixed point, as for instance a street beyond which the building cannot expand. If it is to be one-story throughout, the service functions still must be at some fixed point. When this is the side bordering on a main rail line or a heavily traveled street, placing the intermittently used areas such as toilets, locker rooms and cafeterias there may serve a further purpose. They will tend to blanket noise from the other work areas and thus contribute to the improvement of working conditions throughout the plant.

GUAVA — New Vitamin C Material

Eloina guava, natural size.

By JOHN GODSTON[1] and MILTON CHANIN[2]

Containing four to ten times as much vitamin C as the orange, this tropical fruit has proved valuable as an enriching ingredient in processed foods. The authors tell how it is processed and give formulas for its use

WHEN the Army contracted for large quantities of guava products for use in the field—as an important source of natural vitamin C in the diet of troops—this tropical fruit came to the attention of food manufacturers. In certain rations supplied to the American forces, jelly and jam manufacturers were required to incorporate at least 10 percent of guava to help provide this essential vitamin element.

Even in its poor varieties, the guava contains four times as much vitamin C as the orange, hitherto held to be the best popular source of this factor. In good varieties it shows a phenomenal yield—up to ten times the vitamin C content of the orange. Thus the guava is topmost in the list of fruits bearing this valuable nutritional element.

This tropical standby also is a fair source of vitamins A and B_1, and it contains some vitamin B_2. A further breakdown shows it to contain 11.6 percent of carbohydrate, 0.6 percent of fat and 1 percent of protein.

Vitamin C Is Stable

In most fruits, including oranges, vitamin C is not present in a stable state, and it tends to lose its potency quickly, especially when exposed to warm temperatures. The guava, however, retains a high percentage of its vitamin C even under adverse conditions. Tests made on the fruit, not only in its raw states, but after stewing, canning and jelling, showed the vitamin C content to be remarkably stable. Thus, finished products containing the fruit have a longer resistance to loss of vitamin C potency during shelf life.

Pectin and Acid Balance

For the jelly, jam and juice manufacturer, as well as the baking and confectionery industries, particular interest lies in the balanced pectin and acid properties of guava, which make it easier to attain the required pH value in products to which guava is added. The fruit has a high pectin content—about four times as much as is needed to set itself into a jam or jelly of firm consistency. When combined, for instance, with strawberries, blackberries, loganberries, grapes, pineapple, plums or raspberries, which are average in pectin and acid, guava will help substantially to raise the level of these properties.

Effect on Flavor

Flavorwise, the guava improves combination fruit products, not only contributing a desirable taste "overtone" but "highlighting" the flavor of the companion fruit. Straight guava jellies, jams, juices, fruit fillers and confections offer a pleasantly novel taste experience. The limited amounts which have been offered in recent years have found a ready popular market.

Types of Guavas

Guavas grow in many types as to size, shape, color, fragrance, flavor and vitamin content. Some are rounded, of the size of a large

[1]Production Manager, Scientific Nutrition Corp., New York.
[2]Chief Chemist, Scientific Laboratories, Inc., New York.

peach or tomato; others are pear-shaped. In surface color, they run from light yellow to orange and green; in flesh color, from white to yellow, tan and red. In odor, they vary from mild to very strong; in flavor, from very acid to very sweet; in core size, from very small to very large; in seed number, from few to very numerous.

Selection of types for processing is naturally based on careful laboratory determinations, so as to obtain varieties superior in taste and nutrient value. Field surveys are carried out regularly for this purpose. Types with the salmon-colored flesh generally have a much lower vitamin C content than somewhat similar pink-fleshed varieties.

How Guava Is Canned

Harvested at full maturity, when the vitamin content is highest, the guavas are brought to the canning plant quickly. The first operation is dry-grading to remove green, overripe and unsound fruit. Then the fruit is carried on a roller conveyor to the washer, where it is dumped from hampers into highly turbulent water. The water is recirculated through the 30-ft. wash tank by a pump, the current moving the fruit along. Top and bottom sprays provide positive washing action.

At the discharge end of the washer, the fruit is raised onto an inspection belt by an all-metal continuous elevator. Then it is graded a second time and trimmed.

As the guavas leave the inspection belt, they pass first under cold-water sprays for washing and then under steam jets which scald the fruit to kill any organisms that might subsequently cause off-flavor or spoilage.

After scalding, the fruit is elevated to a vertical precooker in which it is processed in live steam at 30- to 50-lb. pressure for 15 seconds to 1½ minutes. The fruit flows continuously through the precooker by gravity, the time in the process being regulated by the height of the fruit in the chamber and the opening of the gate valve through which the fruit discharges at the bottom. Precooking facilitates subsequent separation of the seed from the flesh of the fruit.

The precooked fruit now passes through two batteries of seeders and then goes into a paddle-arm finisher. The latter reduces the flesh to a fine puree.

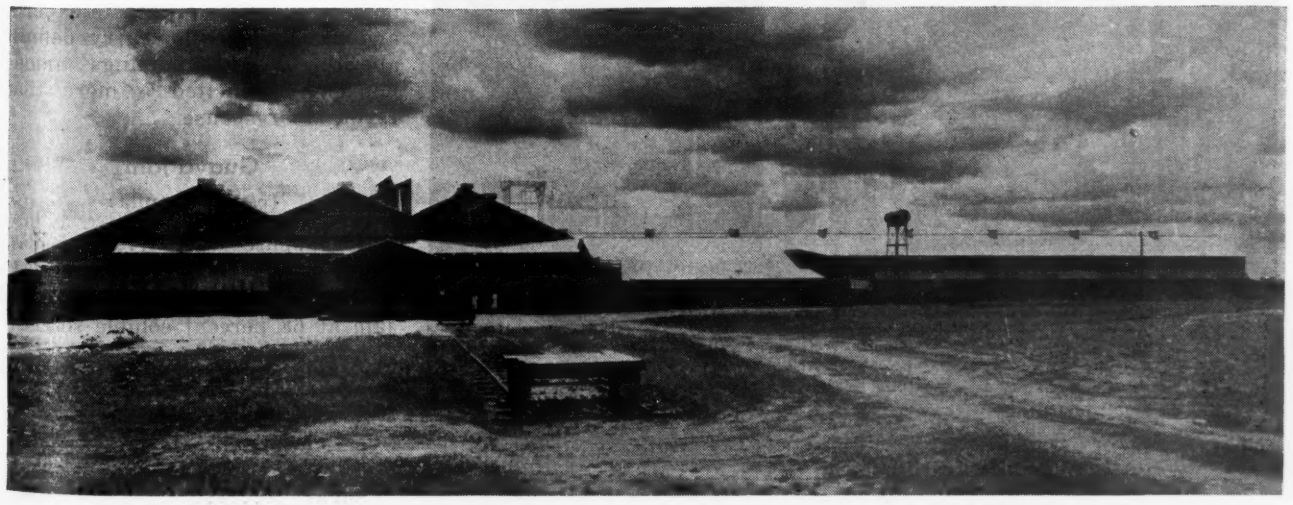
Now through the preparation line, the puree is filled into No. 10 tins, passed through an exhaust box and vacuum sealed. Important to the quality is the fact that the fruit is in a blanket of steam from the time it is broken until it is in the can.

Retorting is done in perforated metal baskets, mounted on casters for ease in handling. After filling, the baskets are moved to the open water retort by lift trucks. A power hoist picks them up and lowers them into the hot water, then removes them at the end of the process. The water in the retort is held at 212 deg. F. and the process is continued 30 minutes to an hour, or until the fruit at the center of the can reaches a temperature of 190 deg. F.

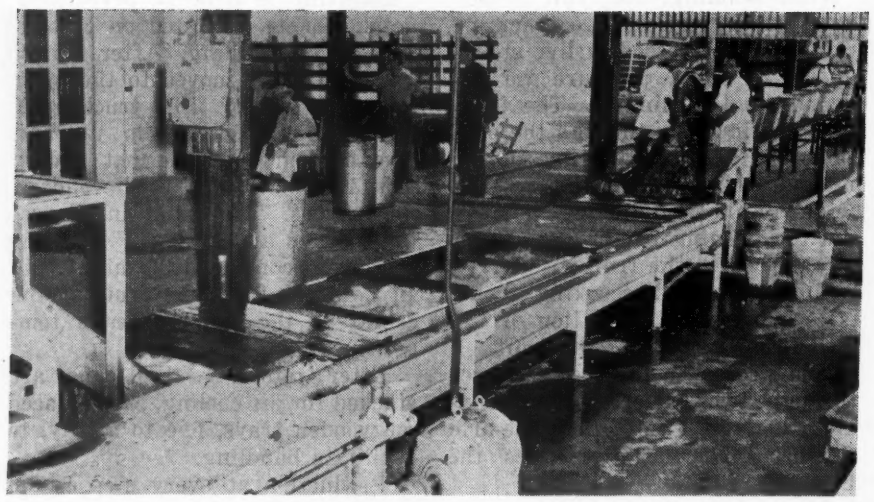
After retorting, the cans are stacked for air cooling, being placed on wooden trays, five to a tray, to facilitate handling.

Production at every step is supervised by a laboratory staffed with chemists and food technologists. The production manager has had 10 years of canning experience. All of the equipment is stainless steel or tin, thus safeguarding the vitamin content of the fruit, which is apt to be destroyed by contact

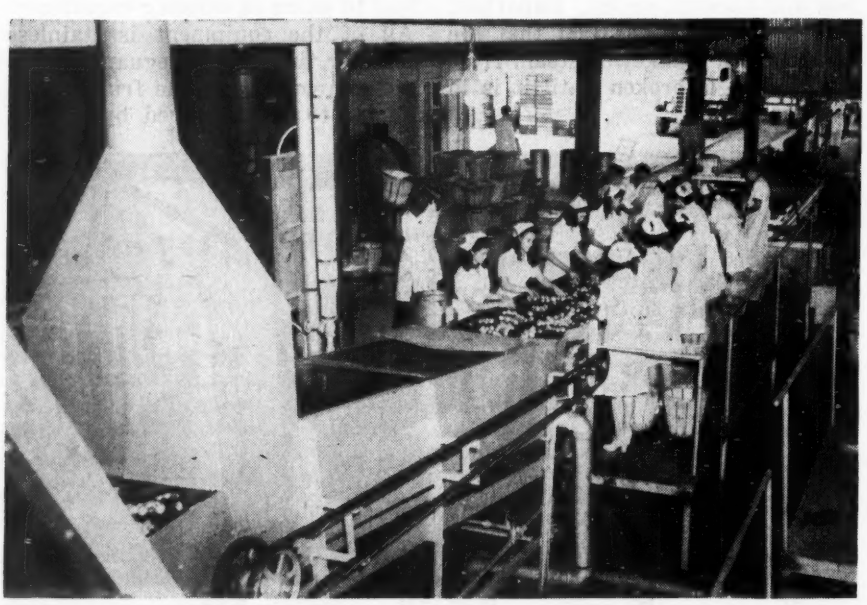
At the receiving platform, the guavas are inspected and dry-graded to eliminate green, overripe and unsound fruit.



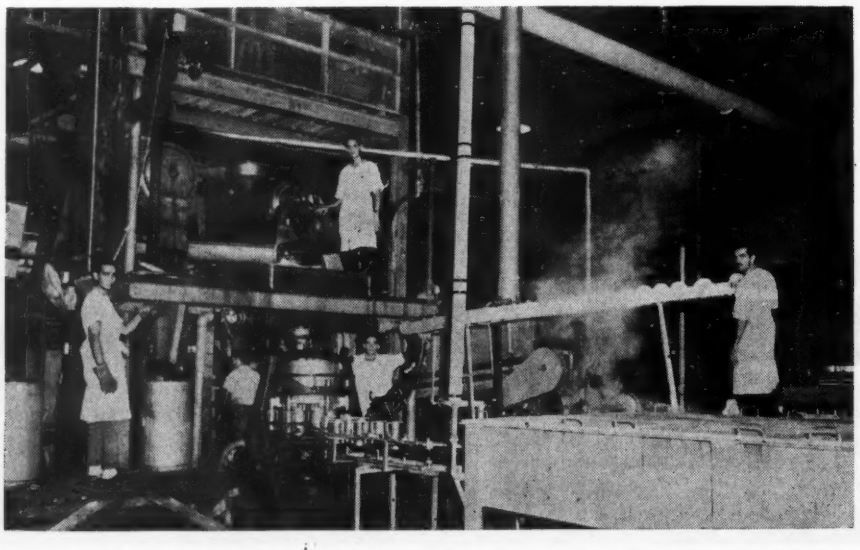
Big guava packing plant of American Tropical Products Corp. at Colon, Cuba. Largely American owned and operated, the plant has a capacity of 10,000 tons of canned guava puree a season—June to October.



Hampers of dry-graded fruit move on a roller conveyor to the washer. At discharge end of washer, fruit is picked up by an elevator and lifted to an inspection belt.



After inspection and grading, the fruit passes under cold water and steam sprays (left foreground) and is elevated to the precooker.



Fruit flows by gravity through vertical precooker (which doesn't show in this picture), then goes through seeders and finisher, into holding tank, to can filling machine, and then to the exhaust box (right).

with copper and iron. This equipment is the most complete and modern yet perfected for the industry.

The mammoth packing plant of American Tropical Products Corp.—largely American owned and operated, and located at Colon, Cuba—produces the greater part of the guava being imported into this country. The plant can process 10,000 tons a season, from June to October.

Originally built to supply holders of primary government contracts for special Army rations incorporating vitamin-rich guava, these plants now are releasing carload lots of dehydrated and pureed products for jam, jelly and juice manufacturers and for the candy, baking and other food industries.

The puree is available in large tonnage the year round. It has a bright pinkish-salmon color, with pleasantly characteristic fragrance and flavor. It supplies, on the average, 140 mg. of vitamin C per 100 g. of puree. It contains more than 8 percent of soluble solids and has a mold count (Howard method) of less than 20 percent—considerably more favorable than the standard for other products—tomatoes, for instance. The crude fiber content is 5.5 percent; ash, 0.7 percent.

Formulas

Formulas are given below for satisfactory guava products developed locally in the experimental laboratories affiliated with Scientific Nutrition Corp. These formulas are presented principally to suggest the wide area of adaptability of this fruit.

Samples of many products, including those mentioned here, were distributed among nutritionists, home economists and taste experts, and were judged to carry definite appeal. Many samplings among housewives elicited a more than favorable response.

Guava Jam

(50-50 formula)

Water	10 lb.
Guava puree	50 lb.
Sugar	50 lb.

Cook to 223 F. to obtain finished jam at 68 percent soluble solids.

Pineapple-Guava Jam

(50-50 formula)

Water	10 lb.
Pineapple	40 lb.
Guava puree	10 lb.
Sugar	50 lb.

Cook to 223 F. to obtain finished jam at 68 percent soluble solids.

Cherry-Guava Jam

(50-50 formula)

Water	10 lb.
Cherries	40 lb.
Guava puree	10 lb.
Sugar	50 lb.
Pectin (Grade 100-Exchange)	2 oz.

Cook to 223 F. to obtain finished jam at 68 percent soluble solids. The addition of a small amount of pectin is necessary because of the low pectin content of cherries. Naturally, no extra pectin would be required if a greater proportion of guava were used.

Peach-Guava Jam

(50-50 formula)

Water	10 lb.
Peaches	40 lb.
Guava puree	10 lb.
Sugar	50 lb.

Cook to 223 F. to obtain finished jam at 68 percent soluble solids.

Guava Jelly

(45-55 formula)

Guava juice (8 percent soluble solids)	54 lb.
Sugar	50 lb.

Cook to 223 F. to obtain finished jelly at 68 percent soluble solids.

Guava Jelly Candy

Guava puree	10 lb.
Sugar	20 lb.
Tartaric acid solution (0.392 oz. of tartaric acid per fluid ounce)	4 oz.

Cook to 220 F. and cast in starch molds.

Orange-Guava Marmalade

(50-50 formula)

Orange, juice and thin-sliced peel	40 lb.
Guava puree	10 lb.
Sugar	50 lb.

Cook to 223 F. to obtain marmalade at 68 percent soluble solids.

Guava Extract

(For flavoring)

Guava puree	10 lb.
Isopropyl alcohol	4 lb.
Water	4 lb.

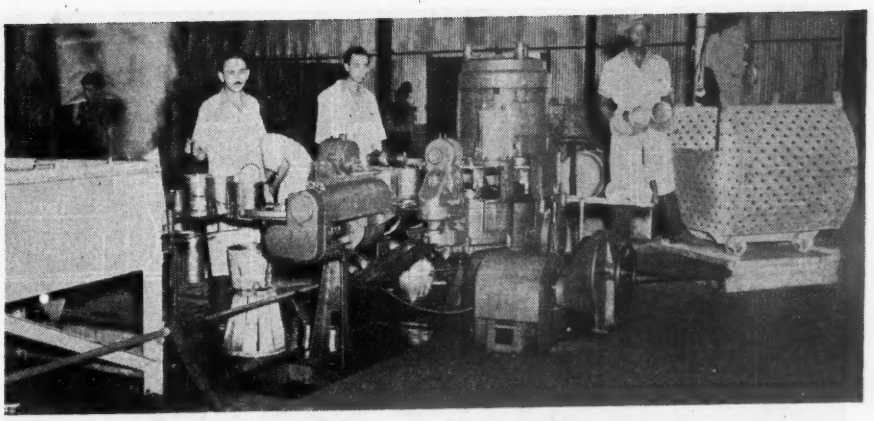
Mix together and place in closed container. Keep in warm place for about a week, with occasional shaking. Filter off insoluble matter, and then distill the alcohol from the filtrate.

Guava Sirup

(For drinks)

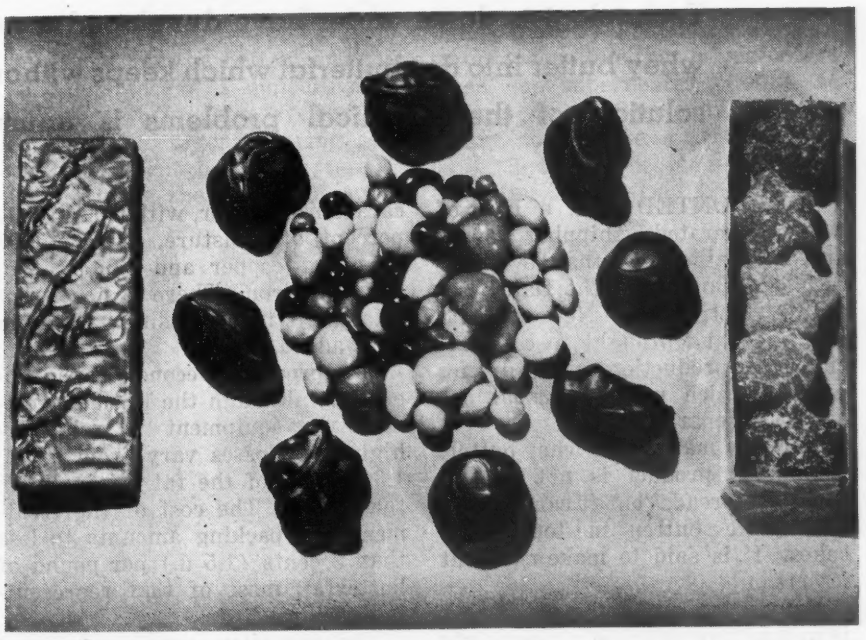
Guava extract	1 lb.
Sugar	5 lb.
Water	6 lb.
Tartaric acid solution (0.392 oz. of tartaric acid per fluid ounce)	2 oz.

Cook together until all the sugar is dissolved. Yellow coloring may be added to intensify color.

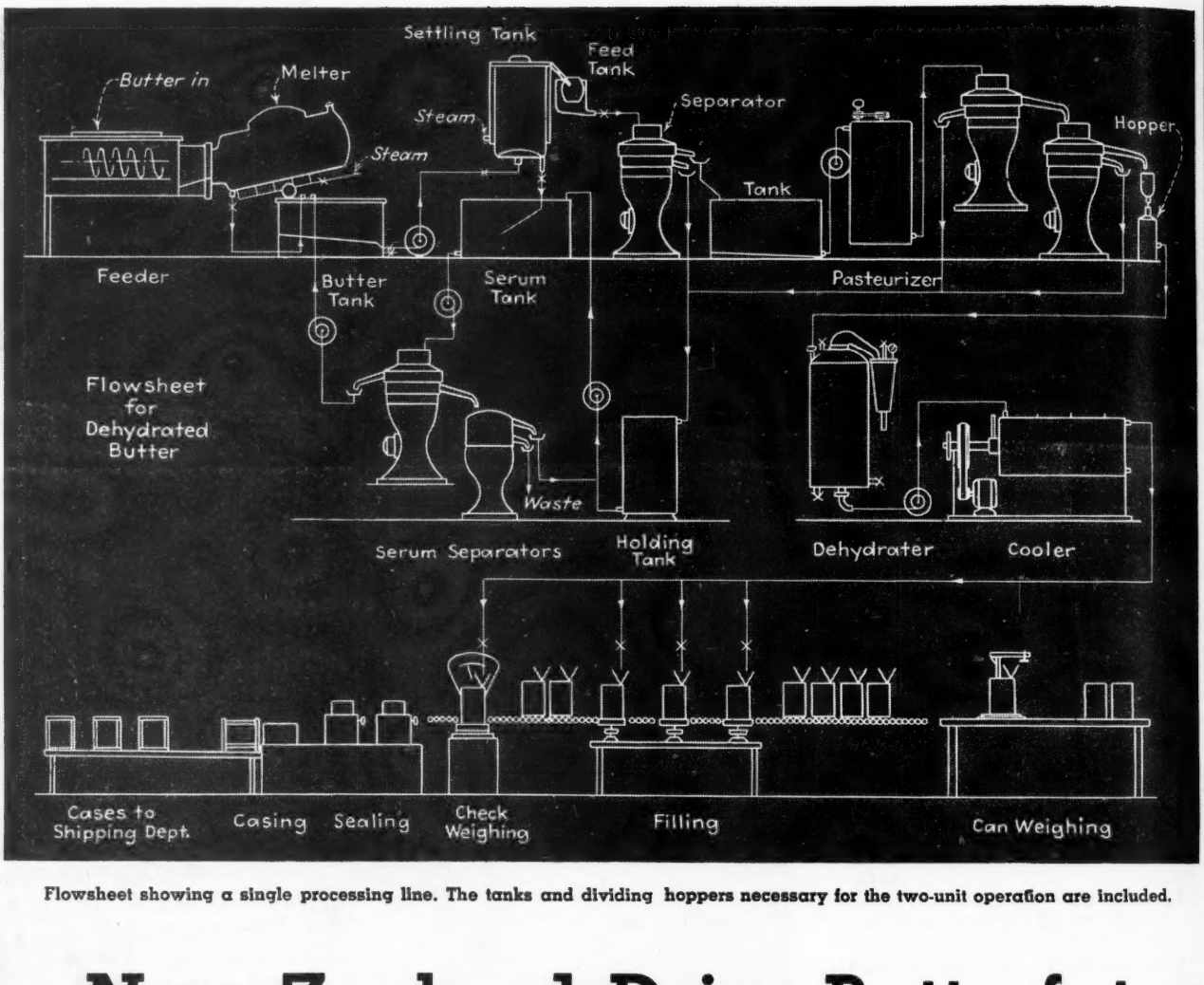


After leaving the exhaust box, the cans pass through a high-speed double-seamer and are placed into retort baskets.

After retorting, the cans are stacked on wooden trays for air cooling.



Here are four types of confections which contain guava. At the left is a guava-caramel bar containing 20 percent guava; at the right, jelly gumdrops with 15 percent of guava. In the center are panned dehydrated pineapple-guava pieces, with a 15 percent guava content. Around the pile of small panned pieces are chocolated-coated jellies with 30 percent guava content.



Flowsheet showing a single processing line. The tanks and dividing hoppers necessary for the two-unit operation are included.

New Zealand Dries Butterfat

Technologists down under have developed a process for converting whey butter into dry butterfat which keeps without refrigeration. Their solution of the technical problems is unusual and interesting

CONFRONTED with a lack of refrigerated shipping space and a greater need than ever for edible fats overseas, the Dairy Research Institute of New Zealand developed and brought to commercial-scale production a fat-drying process which makes unusual use of cream separators.

The raw material is whey butter. The dried product is not in any sense a "spread," but it can be used to replace butter in toffee and cakes. It is said to make excellent ice cream.

Before describing the process, it is well to take notice of a few points included in the summary of the report on this project.* First of all, the butterfat produced has very high keeping quality. It is without caramelized flavor, with 0.02 to 0.04 percent of moisture, 0.01 to 0.03 p.p.m. of copper and 0.02 to 0.15 p.p.m. of iron. There is no loss of vitamin A in processing. Vitamin D is added.

The process is economical in operation, although the initial investment in equipment is relatively high. Fat losses vary from 0.9 to 1.3 percent of the fat originally in the butter. The cost of the treatment and packing amounts to less than 3 cents (1.5 d.) per pound of butterfat, most of that representing packing costs.

The operation can be conducted on a commercial scale. The King's Wharf plant, at Aukland, working two shifts, has a capacity of 10,000 tons of the dried butterfat a year.

Briefly, in the method finally adopted, butter is melted under 1 lb. steam pressure, some of the serum is separated by gravity, the fatty portion is centrifuged, reheated, again centrifuged (using two separators in tandem), dried under 29 in. of vacuum, then cooled. Fat-containing serum from the first two separators is recirculated. The filling line includes provision for accurate weighing.

The product itself is not new, but the dry butterfat heretofore available either was prepared over an open flame, with consequent

*By F. H. McDowall, R. M. Dolby, E. Beatson and J. J. O'Dea, The Commercial Production of Dry Butterfat, Dairy Research Institute of New Zealand Publication No. 166. New Zealand Journal of Science and Technology, vol. 24, 53B to 78B, 1942.

very undesirable changes in the flavor, or was made by methods which were suitable for laboratory or small-scale production but which could not be applied commercially. The New Zealand technologists recognized from the first that in any process adopted to meet British requirements the fat should not be held hot for any length of time and should never be overheated. Also, the process must be continuous, both to maintain quality and to reduce labor requirements.

Preparation of the dried butterfat by centrifuging melted butter was decided upon after a survey of several methods. It is possible to start with cream and centrifuge but this involves the treatment of 9,000 gal. of cream to make 20 tons of butter. Since it is necessary to dilute with as much as five times the volume of water, 45,000 gal. of liquid would have to be handled within a period of a few hours. Any large production by this method would be wasteful in energy and equipment, even if physically feasible.

When the moisture is separated from butter by direct heating, difficulty is encountered due to frothing, so that wide shallow vats must be used. The product always has a caramelized flavor which would not be acceptable to the British consumer.

Frothing is also encountered in the evaporation of melted butter in a vacuum pan. At the end of the evaporating cycle the temperature rises to a value which is too high to insure good flavor.

Use of Cream Separators

During 1934 and 1935, the Institute had gathered considerable data on the use of an oil centrifuge of the Alpha Laval type for the preparation of ghee, but on account of war conditions no oil clarifiers of this sort were available when work was resumed on a larger scale. It was found, however, that farm-type separators in series dried the melted butter to 2 or 3 percent water content. This is low enough for the purpose.

In order to make a sufficiently dry final product it is necessary to remove part of the serum before the fat enters the centrifuges and to provide a final drying operation to eliminate the moisture left in by the separators.

Serum Separation

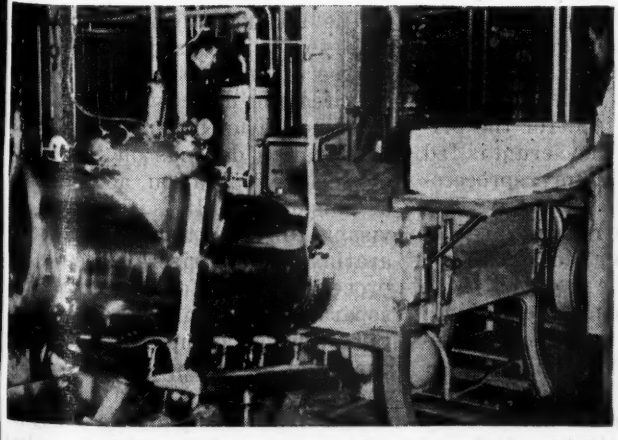
Gravity separation before centrifuging is very desirable, but to allow the warm butter to stand for several hours while "oiling off" would adversely affect the flavor and decrease the keeping qualities. One problem encountered was the great variation in density of the butter serum, which makes automatic control difficult.

The gravity separating unit finally adopted is very simple. A central 2-in. pipe conveys the fat and water mixture to the top of a 2-ft.-diameter cylinder. At the outlet of the feed pipe, a small inner cylinder with a perforated plate gives smooth flow and serves as a strainer. The upper edge of the outside cylinder is cut with notches through which the fat is skimmed to a feeding tank for the centrifuges. The aqueous portion is drawn off through a tap at the bottom into a serum tank, from which it is recirculated. The vertical wall of the cylinder is hot-water jacketed except for the bottom and top 6 in. The jacket is omitted near the bottom to prevent development of convection currents during settling. It is cut below the top in order to avoid the danger of overheating the fat film in the overflow duct during stoppage of the plant.

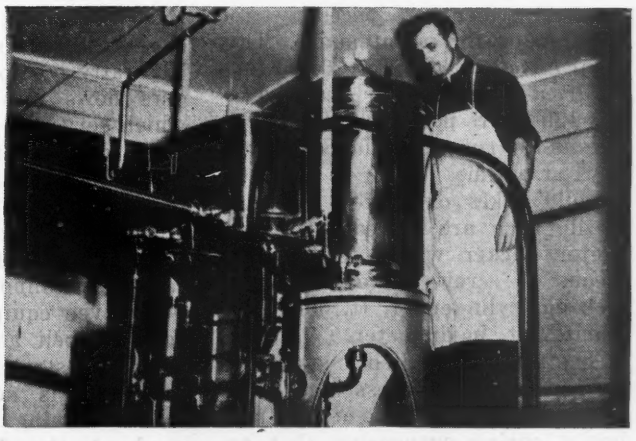
The Dehydrater

The vacuum drying unit is a steam jacketed cylinder about 24 in. in diameter and 45 in. high. Melted fat enters from the top through a distributor ring and flows evenly down all the side wall. This distributor ring is of 1½-in. pipe placed so as to give a clearance of ½ in. from the cylinder wall. Holes of 3/10-in. diameter are punched evenly along the pipe in about the 4 o'clock position so that fat emerging from the ring is directed somewhat downward and toward the cylinder side. A skirt sloping toward the cylinder wall is welded to the bottom of the pipe ring to redivert any fat which may flow down. In this way, a thin moving film of fat is exposed to the heat and vacuum, so that the time of exposure is minimized. The vapor collecting pipe for the vacuum system, which enters through the lid, extends below the fat distributor ring to prevent fat spray entrainment. It is expanded to 9-in. diameter at its lower edge.

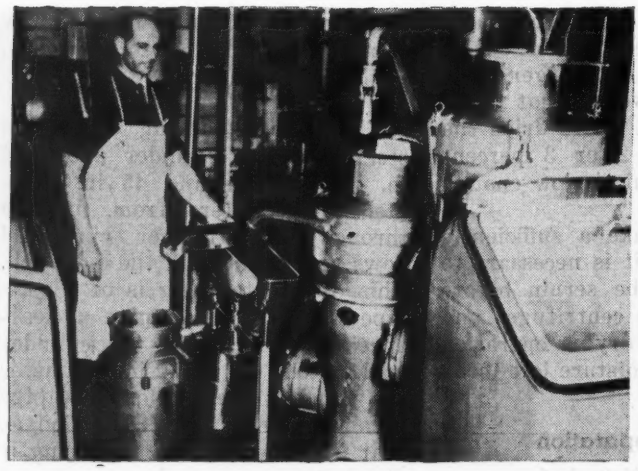
Even under a vacuum of 29 in. and with a fat temperature of 190 to 200 deg. F., water is not completely removed. In fact, water is distinctly soluble in hot butterfat, so that the later stages of drying represent a fractional distillation from a homogeneous liquid, rather than a straight evaporative process. When the moist fat hits the rapidly moving vanes of the fat-discharge pump, there is a sudden freeing of water vapor, like that which occurs when a superheated liquid is stirred. On this account, it is necessary to provide a water vapor outlet in the fat drainage line. The fat outlet is one arm of a Y, sloped



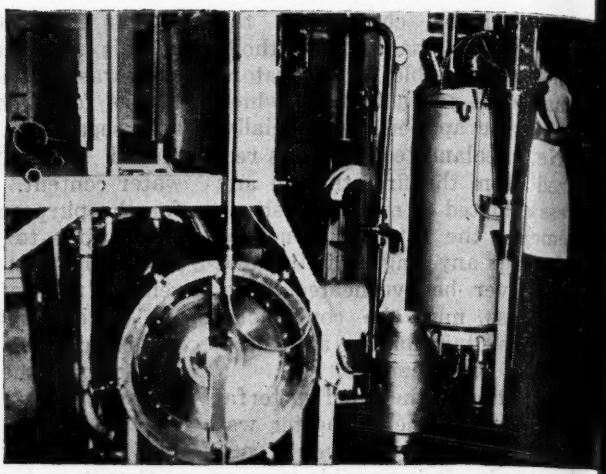
The tilted melting cylinder is fed by the screw-conveyor butter packer at the right. The melter has a sliding suspension to permit separation of the two units for cleaning.



Gravity separation in these units removes part of the serum and eases the load on the centrifuges. The water jacket stops short of the top to prevent overheating of the fat.



Secondary separators are used in tandem. The high-fat feed is reheated before separating, to improve recovery. The separated fat is down to 2 or 3 percent of water.



The vacuum dehydrater, operating at 190 to 200 deg. F. and 29 in. of vacuum, removes water down to 0.02 percent. The dry fat is cooled in the enclosed drum at the left.

somewhat upward toward the pump so that it serves as a trap. The other arm of the Y is carried back into the vacuum cylinder to end in a Tee vapor outlet. This is only partially successful in relieving the back-pressure of released vapor, but the ebullition in the pump has the advantage that within certain limits it acts as an automatic regulator of the maximum moisture content of the product. It is believed that a pump with a larger inlet would be helpful, but one was not available for the test plant.

The separating cylinders and the vacuum dehydrater have been described in detail because their construction required special modification to handle the butterfat mixture. The entire processing scheme is shown in the flowsheet.

Two-unit Plant

The King's Wharf plant has two processing lines, with the equipment so arranged that, beyond the melter, the load can be taken off any one piece of equipment and diverted whenever necessity for cleaning or for maintenance. This plant has a capacity for 10,000 tons of dried butterfat per year, working 120 hours per week. The practice is to run continuously for 5 days at a time.

Solid cakes of butter weighing 56 lb. each are placed in a bulk butter packer which feeds it by means of screw conveyors into a melting cylinder, 4 ft. long and about 2 ft. in diameter.

The fat to be melted is supported on perforated stainless steel trays inside the melter. One of the trays has a spring suspension that operates a cut-out control on the feeding screw, preventing overloading of the melter unit. Steam is admitted through a series of jets in the bottom of the cylinder, below the trays, so that the melted fat does not come in contact with hot steam pipes. A steam pressure equivalent to about ¾ lb. can be maintained in the cylinder. The fat outlet is near the throat end and the entire cylinder slopes at an angle of about 10 degrees down to this outlet. A roller suspension permits the unit to be moved back from the screw feeder for cleaning. Depending on the temperature of the butter being fed, the capacity of the melter is between 1½ and 3 tons per hour.

Melted butter flows through a gooseneck into a tank and through a float valve control to the fat pumps.

A MacEwan rotary pump with sliding vanes tipped with fiber conveys the fat to the gravity settling tanks.

Two of the gravity cylinders are used. The valves in the inlet pipes are so connected that flow can be apportioned between the two as desired, but it is never possible to close both valves at the same time. The fatty portion from these cylinders flows into a collecting tank which serves as a feed for the primary centrifuges. The serum is fed to a collecting tank, for reprocessing.

Direct-drive centrifuges are required because a certain amount of fat spray cannot be avoided. With belt-driven equipment, the fat will coat the belt and cause both slipping and stretching. The type of separator is not critical, several makes having been successfully used at the Institute. DeLaval cream separators are used at the King's Wharf plant.

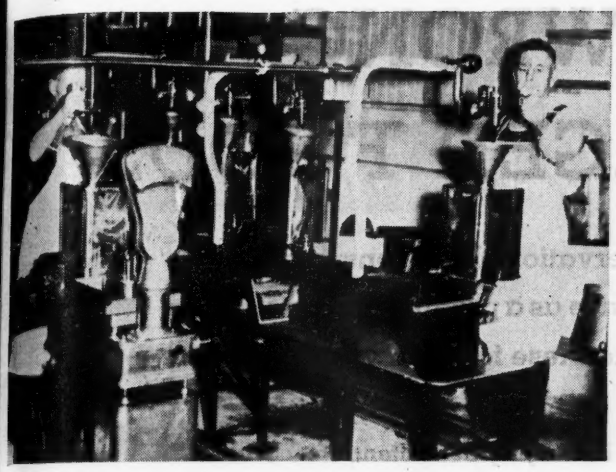
For the two-unit plant, three primary separators are used. Serum for reprocessing is collected with that from the gravity settling tanks. The fat passes directly to the pasteurizers.

In order to use the cream separators for fat, the bowls must be filled with hot water to prevent sludge deposition in starting up. Occasionally during operation the bowls must be flushed with very hot water. Melted butter can be run through at a speed of about two-fifths the rated capacity for milk.

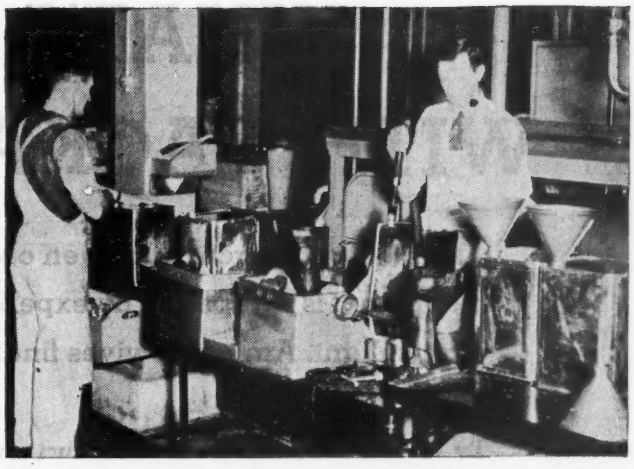
Normally, the two outside machines carry the load, one for each processing line. The third centrifuge is centrally located, and can be used to take over for either of the others when they are down for sludge removal. With butter which has poor oiling-off properties and so separates less completely in the gravity tanks, it is sometimes necessary to use all three of the primary separators to maintain production.

The secondary centrifuges comprise two pairs in series, the fat discharge of the first member of each pair feeding directly to the second machine. The efficiency of the final dehydration depends on the degree of serum separation accomplished at this point. It is therefore advisable to reheat the fat before separating. Pasteurizers placed in the processing line following the first separators not only reheat the fat but serve as pumps to raise it to the inlet level for the secondary centrifuges.

Although the plant is designed with two complete and independent processing lines, a dividing hopper collects the separated fat from both



Cans with funnels attached are weighed for tare, then accurately filled to weight. The value of the product is considered to justify extra care in weighing.



Precautions against oxidation include removal of the last air in the "tin cramp" after the filling-hole disk has been soldered in place.

lines and distributes it to both dehydraters. Valves are so arranged that the flow can be apportioned in any desired ratio, so that in case of trouble on either of the treating lines, or in the event that one dehydrater is not working properly, the whole operation need not be interrupted.

To avoid oxidation, all fat lines slope slightly upward in the direction of flow so that they remain full as long as the plant is in operation.

Fat Recovery from Serum

Serum from the gravity centrifuges is all pumped to a collecting tank and then to two fat-recovery separators. It is only after passing through the second of these that the serum is discharged to the waste. The recovered fat is piped to the original melted fat tank for reprocessing. The volume of liquid handled in these separators is sufficiently great so that there is little or no difficulty with sludge deposition.

Cooling the Dry Fat

The fat from the dehydrater offers three distinct problems in cooling. Heat transfer through the melted fat is very poor so that it is not possible to use a large-diameter coil. The tendency to crystallize when cooled makes a small diameter coil undesirable, particularly as pumping the cooled fat through the small pipe would throw a very great load on the pump. Reaeration of the finished fat must be avoided, which precludes use of a rotary drum of the sort used for lard, even if a way were found to avoid product losses through better design of this equipment.

The cooler finally adopted is a rotating drum with vanes on its outer surface, inclosed within a water jacket. The fat is forced through between the drum and the jacket. The drum has a clearance of 3/8 in. and the ribs are 5/10 in. high, giving a clearance of 1/16 in. between the edge of the rib and the jacket. The small fat capacity is advantageous if trouble is encountered with fat freezing. It is easily cleaned, as the drum can be removed from its spindle. Butterfat lubricates the tin bearings. The design prevents feeding back of this lubricating fat into the processing line.

The Filling Line

Butterfat from the coolers is carried by a pipe system over the filling table. Hand-operated trip valves are provided at the various weighing stations. Gasoline-type square cans hold 39 lbs. of butterfat each. The 1½-in. filling hole has a turned-down edge.

Tin funnels made up to standard weight are attached to the clean cans. These funnels are a slip fit in the filling hole, and are provided with an air passageway to prevent air-lock in filling.

The can with the funnel attached is weighed and marked with the tare. Vitamin D is added and the tins are then filled almost to weight. At a check-weighing station fat is added to make the final adjustment. Such care in weighing is considered necessary on account of the value of the product.

A closing disk is soldered over the filling hole, then the tin is put in a "tin cramp." A small hole in the highest corner provides escape for the air. The tin is squeezed until the fat just reaches

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Filled tins are slid on the side into the shipping case.

WHAT'S WRONG WITH PACKAGED FOODS

Pointed and practical kitchen observations by a consumer whose judgment is sharpened by experience as a product and packaging consultant. Are housewives finding these faults in your products?

By HELEN DAVIES, Creative Product and Packaging Consultant, New York, N. Y.

CONSIDER our progress in such important matters as nutrition and sanitation. Then turn to your pantry shelf. You are in for shocking surprises, when you think of the present-day advances in science and technology. What follows may not happen in professional testing laboratories but they did, and do, happen every day where it counts most—on the consumer's pantry shelf.

Here is the result of a first-hand study in my own kitchen, conducted under average home conditions over a period of time. There is nothing imaginary in the following analysis; no prejudice or controlling "influence" with regard to any product or brand. We talked with other consumers about some of these questions. Constructive, practical suggestions are outlined with our findings.

It Happened at Breakfast

For the main breakfast course, I remembered the family was tired of "cold" cereals. On a cool summer morning, I began to cook a wheat cereal, in keeping with "Eat a Better Breakfast" nutritional appeals. This cereal had been bought three weeks before and used once. When I pushed the cover back to pour cereal into boiling water, I quickly stopped. A dozen weevils were rapidly crawling on top of the cereal. My appetite promptly vanished as I disgustedly threw away the box and its contents. Is it possible that such instances cause many women to become cynical buyers and try a "new kind"; or, what is worse, become non-users? Similar experiences with packages of oatmeal and wheat-germ followed.

This brought me to thinking of some important economic and marketing points. First, the high cost of bacon and eggs in the present war period might have turned many more families toward using cooked cereals on a year-around basis, especially the lower income homes and the farm and laboring populations who need hearty breakfasts. People in certain climates represent good sources for increased consumption of hot cereals. In the past, reports have been made that not enough hot cereals were consumed by the average person.

This problem of infestation impressed me as serious. Is there no way of overcoming this difficulty?

Let us return to the breakfast scene. Fruit juice was finished. Hastily, I served a dry cereal. Coffee and milk were "gulped" down. The dry cereal got "polite" treatment. Why—it's a new kind that they acclaimed so tasty one week before! I tried it, believing that the family had not had time to eat it. Where it first had been crispy there was now a stale, rubbery taste.

For lunch, a vegetable salad required the opening of a bottle of liquid seasoning. The cap and spout were rusty. Wiping them off, I had misgivings as to some rust passing out from the narrow hole which I could not reach.

Whose products are these? They are nationally advertised and distributed. Many millions of dollars have been invested in promoting product and tradename acceptance. Surprisingly enough, many of these products reveal that little or no creative effort was invested toward developing more effective and appealing packages. A sound, distinctive package makes its daily "debut" before millions of consumers who decide the fate of your product. Will it become a flirtation, a quick divorce or a permanent marriage?

Many women would like to use brown sugar more frequently, in a variety of dishes. This is now almost impossible. It becomes hard as a rock, sometimes even before the package is opened. Over a coast-to-coast radio broadcast, I mentioned this as a pet peeve. This was a noncommercial talk. The artist, whose "guest" I was, reported that six weeks later women were still writing her, mentioning brown sugar as a particular pet peeve of theirs! A challenge and opportunity for good manufacturers and technologists.

Point-of-use Selling

It is generally conceded that, in the long run, no product is really sold unless it sells itself in repeat sales. More effort should be devoted to point-of-use values. Where greater creative and practical thinking have been concentrated on point-of-use, the point-of-sale or distributive processes have benefited in steady repeat business.

It should be realized that every manufacturer and distributor now faces wiser buyers—the result of wartime changes and growing consumer education. This spreading of knowledge is making women aware of "optical illusions" as to containers, sizes and usefulness.

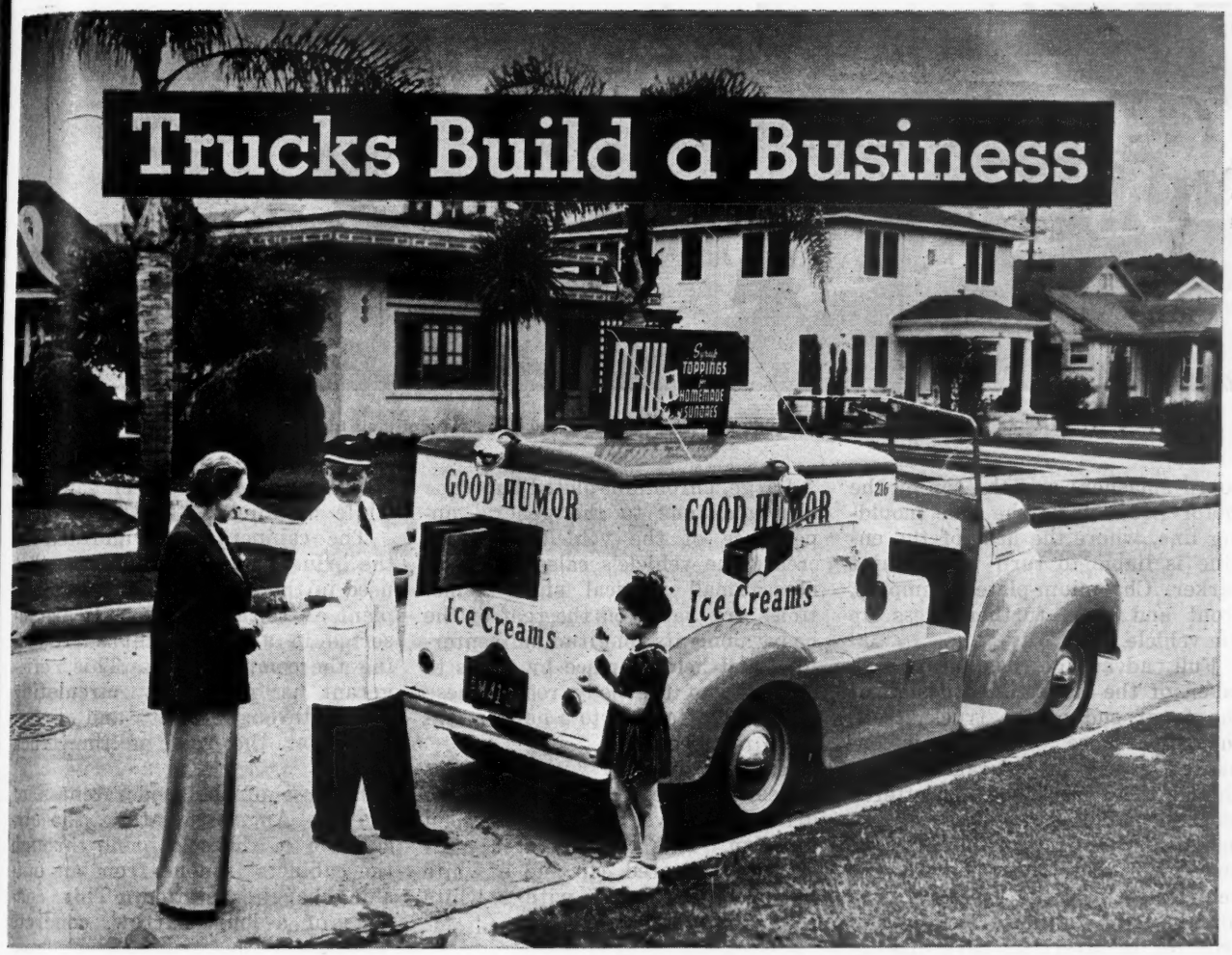
In giving thought to the food jar, while it has many good points, I believe the utmost in consumer convenience and usefulness has yet to be developed!

Consider gelatine and pudding packages. All those folds and corners of the inside wrapper have to be controlled to avoid powdery spillage when pouring the contents. From the design viewpoint, these packages could be made more colorful for postwar homes.

One packaging executive reports

(*Turn to page* 194)

Trucks Build a Business



Cleanliness of the truck and the driver-salesman are essential in the direct distribution program of this popular ice cream product.

While the driver is seen here making use of the rear compartment, the picture also shows the forward or sidewalk door.

Good Humor's direct sales of its popular ice cream products are greatly increased by the company's development and care of its fleet of trucks. Its methods are described here in detail, including "plug-in" truck refrigeration

SMALL-capacity trucks with refrigerated bodies have helped to increase the retail sales of ice cream novelties by getting them to advantageous selling points quickly and keeping them in first class condition until all are sold.

As compared with horse wagons and men on bicycles, the small trucks with a very low gas consumption have a great advantage in distribution. In some cases they are able to carry two loads of the ice cream delicacies to the same point within the working day of the driver-salesman. In other cases they are able to cover regular extended routes.

Where the product is a meritorious one, the problem of merchandising is essentially one of salesmanship. In this case, the trucks used must fit into the selling plan. They must be attractive in appearance and they must be kept clean. No one thing is more apt to retard the sale of any food product than a dirty vehicle in which the product is carried, or from which it is distributed. Along with the truck, the driver-salesman must be neat and clean in order to sell most effectively.

These fundamental principles are exemplified in the fleet of trucks operated by the Good Humor Ice Cream Co. of Los Angeles, Calif. This company was formed in 1927, with ten trucks in service. Now it has over 100 trucks in its automotive fleet. Most of the retail trucks in use are of the half-ton size, similar to the Model K-1 Internationals shown in the accompanying illustrations. Over 80 such Internationals are included in the company's truck equipment.

The trucks were made attractive in appearance by the use of low, streamlined, two-hole refrigerated bodies, painted in two light and bright standardized colors. The colare are white and a robin's-egg blue, known as Good Humor blue, and used by all Good Humor franchise holders throughout the United States.

White is universally associated with cleanliness and purity. Its use is very important when food-products, such as ice cream novelties, are handled.

But white fenders and wheels are extremely hard to keep clean, so the Good Humor blue is used on the fenders, wheels, running-

This lineup of trucks being serviced affords an excellent view of their trim lines.

board splashers and the top of the motor hood above the side moulding line, where the heat of the engine is liable to turn white paint darker. Chromium-plated bumpers, front and rear, further dress up the vehicle.

Full advantage has also been taken of the streamlined design of the front end of the truck itself, the appearance of which is enhanced by a V-shaped rakish windshield. The truck body is lettered on both sides and the rear. To make this lettering visible at night and to attract attention to the vehicle, each of the three signs is illuminated by an electric light and reflector to divert its rays directly on the sign. To prevent these reflectors from being knocked off the sides by side-swiping, or off the rear when backing up, the side reflectors are well inside the fender line and the rear one is ahead of the rear bumper.

Large, chromium-plated hub caps also add tone to the general appearance of the vehicle. To increase the vehicle's sales effectiveness, small vertical signs sometimes are placed on the roof of the body, along its longitudinal centerline, and held in place by wires to the edge of the body roof. These signs call attention to a new or seasonal number.

To keep in step with the sales appeal of the truck itself, each driver must wear a spic and span uniform. This consists of a military-type visored cap and a white buttoned coat, worn with a white collar and a dark tie.

Cabinet Construction

The cabinet is divided transversely by an insulated partition, at mid-length, to form two compartments. The forward compartment door is reached from the sidewalk, while the rear compartment is reached by the driver salesman while standing in the street.

The cabinet is refrigerated on the brine system, the same as that used in the Good Humor ice cream plant. A series of pipe coils are inserted in a refrigerant surrounding the compartments. This refrigerant is frozen by circulating brine through inlet and outlet valves at the rear of the truck body.

Because of the moderateness of the Los Angeles weather, the circulation of the cold brine through the cabinets is done from an outside charging station. This consists of a long, narrow, concrete platform, with a peaked roof, from which are hung the circulating in and out brine pipes from the main plant. The platform is long enough that 30 trucks can be backed up on each side at the same time, thus serving 60 trucks simultaneously. At each truck station, two hoses are suspended from the brine lines under the platform roof. One hose carries the cold brine to the truck and the other returns the warm brine to the main plant. Cooling capacity is provided for a full 24-hour refrigerating operation.

At the end of their day's work, the trucks are placed on the charging line and the in and out brine lines hooked up to the rear of the bodies. They are left on the line until sufficient refrigeration is provided to carry them through their next day's work. Inside body temperatures may be determined to indicate when a truck can be taken off the line.

The company operates, under franchise, in 11 southern California counties, with a main plant in Los Angeles. Branches are maintained in downtown and eastside Los Angeles and in San Diego, Glendale, Santa Barbara, Long Beach and San Bernardino.

Here is the charing line at which 60 trucks can be refrigerated at one time. The in and out hoses are suspended from the brine lines under the platform roof. One hose carries the cold brine to the truck, the other returns the warm brine to the plant.

FOOD AROUND THE WORLD

Developments in food manufacturing throughout the British Empire, Europe and South America, since 1939, are bound to affect postwar world markets. Here are some changes that have come about during the past six years

By ERIC HARDY, British Food Consultant, Liverpool, England

AMERICAN food manufacturers will find noteworthy changes in the postwar world market. There is much that they can learn from developments that are now held in the laboratories and processing departments of food plants in Russia, the Argentine, in several countries of Europe and in the British Empire. Although Britain is in her sixth year of war, she has gone forward a great way with food ideas.

Global Trends

Australia, South Africa, Canada and Newfoundland are all endeavoring to find postwar markets for their vastly increased wartime canning industries. Over 219,000,000 lb. of foodstuffs is being canned annually in South Africa, exclusive of the 2,320,000 cans of special meat and vegetable pack. Only 15 percent of this total is consumed in the Dominion. Of 105,000,000 lb. of jam produced, only 19,500,000 lb. is for Union consumption. If tinplate is available, it is expected to increase this output to 125,000,000 lb.

Canada has greatly increased production of tinned herrings, which are now produced on both Pacific and Atlantic coasts. Annual output, in 48-lb. cases, rose over 1,800 percent in four years; from 80,000 in 1938 to 1,642,400 in 1942.

With Greece and Italy out of the war, a boom in the vine fruit industry akin to that experienced by Cyprus in 1943 is envisaged. Raisins and currants will be produced. Cyprus is developing a flourishing industry for dried-fig production, and 160 sulphuring chambers are now working there as compared with ten before the war.

Brazil, however, which previously competed with Spain and South Africa for the citrus fruit export industry, is seeing its citrus industry decline as a result of the ravages of a root-rot fungus disease similar to that which destroyed citrus cultivation in the Argentine. Plant disease is also threatening the West African cocoa bean industry. This will have repercussions on the cocoa and chocolate trade, as West Africa is the world's biggest cocoa growing area. Another fungus threatens the resumption of the postwar banana trade from the West Indies.

An English syndicate has erected a new plant at Newry, Northern Ireland, for making dried powdered potato for canning. Apart from a very slight difference in color, canned powdered potato mash is indistinguishable from freshly cooked potato.

Australia, with a surplus of dairy products, now is offering compressed (dried) milk in blocks packed in grease-proof paper. The blocks are so hard, however, that they require special grinding machinery to render them available for general use. The compressed Australian milk block is said to have a keeping life of 10 years.

Machines Developed

In Sweden, a new machine has been invented for eviscerating fish. It comprises a rotary eviscerating roller, longitudinally grooved, working with another eviscerating roller, also longitudinally grooved, to pull the entrails out of the opened head end of the fish. Another invention, in the same country, speeds the dressing of fish. In decapitating, the fish are seized by the tail ends and pulled longitudinally against guides (placed obliquely to the fish conveying direction) in such a way that the head end of the fish is forced against a cutting device.

In a London improvement in the method of hermetically closing jars and other containers, a thermoplastic sealing ring is placed between the lid and the jar. Refrigerators have been improved by a cooling unit provided with two evaporators operating in parallel, one being arranged within the other. They are of the flooded type, with a header and depending refrigerator circulating conduits. A temperature regulator controls the flow of refrigerant in the supply conduit to the outer evaporator.

Portugal has nearly doubled its canned fish exports, mainly sardines. The crisis in Spain's apricot growing districts has been partly solved by Britain's purchase of 10,000 tons of apricot pulp from the Spanish Fruit and Vegetable Syndicate of Madrid. It is to be canned in Spain before delivery to Britain, but Britain is to replace the tinplate used.

Tropical Specialties

An American food company recently wrote me for the vitamin C content of the South African or Cape guava. The Cape guava is richer in vitamin C than any other guava, yielding as much as 600 mg. of the vitamin for every 100 grams of the fruit. Last season's vitamin yield went to 800 mg. For comparison, the orange has a maximum vitamin C content of 60 mg. Two factories in the Union of South Africa are engaged solely in the dehydration of guava, the export being for wounded troops. Dehydrated orange pulp is being exported to Britain for marmalade manufacture. The Deciduous Fruit Board has nine dehydrating plants working on fruit in the fruit season and vegetables at other times. Cape Town restaurants now serve five-course meals of dehydrated foods. The manufacture of food yeast has been established by the Union government, and its research workers discovered the new yeast culture named *torula utilis*. This culture feeds on molasses sugar, so that large-scale food yeast production can be made from the hitherto discarded 130,000 tons of molasses of the Natal sugar industry, previously drained into the Indian ocean. The food yeast can be used to fortify bread and check malnutrition.

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Where Food Standards Stand

There are definitions and standards of identity for 96 foods, standards of quality for 7 and standards of fill for 8. Curtailed by war, work on standards will continue in limited way until original program is resumed postwar

By JOSEPH CALLOWAY, Food and Drug Administration, Washington, D. C.

DEFINITIONS and standards for foods, promulgated under authority of the Federal Food, Drug and Cosmetic Act, are printed in a pamphlet of 50 pages, which contains definitions and standards of identity for 96 foods, standards of quality for 7 foods, and standards of fill of container for 8 foods. Most of these standards were promulgated before the beginning of the war and represent results of a program looking towards the eventual standardization of most of our basic foods.

Standards Set Up Recently

This program was interrupted by changing conditions brought about by the war. Work on food standards has been curtailed, but it is still going on and will continue in a limited way until after the war, when the original program will be resumed.

Since the publication of the pamphlet, SRA, FDC 2, a fill-of-container standard for canned oysters and definitions and standards of identity for a number of cholocate products have been promulgated. There was considerable delay in the final promulgation of the standards for chocolate products for various reasons, not the least of which was loss of personnel to the armed services.

Definitions and standards of identity for macaroni and noodle products also were promulgated in December. But final promulgation of these standards was delayed because of the proposed addition to macaroni and noodle products of water-soluble vitamins and minerals. A final decision in the matter will be based on the record of hearings held in February.

Hearings have been held on proposals to adopt definitions and standards of identity for various breads and for frozen desserts. However, since these records were made, the changed conditions as a result of wartime shortages have necessitated postponement of the promulgation of final standards. The composition of most breads is now regulated by an order of the War Food Administrtaion, and the use of dairy products in frozen desserts is regulated by another order. On the termination of this control, it seems likely that supplementary hearings will be held to bring the records up to date, and then final standards will be promulgated.

The identity standards so far promulgated are mostly for foods for which advisory standards under the Food and Drugs Act of 1906 have been issued in years past. (See list in table.) The quality standards to a large extent cover certain canned foods for which quality standards had been issued under the McNary-Mapes Amendment to the Food and Drugs Act of 1906.

Nature of the Standards

Definitions and standards of identity adopted under authority of the Federal Food, Drug and Cosmetic Act differ considerably from the advisory standards of former years. The theory of advisory food standards was that they represented consumer and industry understanding of the composition of a particular food and that changes might be made by the manufacturer if he explained the change on the label. Under the Federal Food, Drug and Cosmetic Act, a definition and standard of identity for a food prescribes a required composition of the food and, in most cases, lists optional ingredients. Under the advisory standard, the manufacturer decided the optional ingredients he might use and stated their presence on the label; and as long as the food was not otherwise adulterated or misbranded, it complied with the requirements of the 1906 Act. Under the present law, decision as to what optional ingredients may be used in foods for which definitions and standards of identity have been adopted rests with the Administrator; and this is determined by him from evidence taken at the public hearing held for the purpose of establishing the necessary facts.

How Formulated

The new law sets up a mandatory procedure as a basis for formulating food standards. This calls for a formal public hearing where evidence is taken from any interested party; the preparation of a permanent record containing all the testimony given; and an order based on this record, promulgating a regulation prescribing a standard. As a part of the order, the Administrator is required to make detailed findings of fact showing just what he took into consideration in formulating the regulation. The Act also provides a means whereby any person adversely affected by the terms of a regulation may have it reviewed by the courts. An enormous amount of detailed work is necessary for proper formulation of standards.

In order to restrict as far as possible the issues at the public hearing, the Food and Drug Administration adopted a procedure for preliminary consideration of the various questions involved. For this purpose, it created a new Food Standards Committee. This committee considers the problem of establishing a standard from the standpoint of the regulatory food official and offers an opportunity to interested members of the industry and consumers to contribute ideas or suggestions as to what may be done by a standard to prevent abuses. After considering these points, the committee suggests the framework for a standard, outlining the point which it considers essential in determining what the final standard should be. Customarily, this proposal is published with the notice calling the public hearing. It immediately calls to the attention of all interested persons the type of standard being considered and gives direction to the testimony offered. This obvi-

ates considerable unimportant testimony at the hearing. In spite of this procedure, however, the hearings held have tended to be more and more protracted and the records longer. This is due no doubt to an increasing realization by interested industries of the great importance of the Federal standards.

Adoption by States

Although standards adopted under the Food, Drug and Cosmetic Act apply only to foods in interstate commerce, they are adopted by many States under authority of their food laws. Possibly, in time, all States will have the same standards for foods as those adopted for the purpose of regulating interstate commerce. When this is considered, it really can be seen that great care must be taken to present all relevant facts at the hearing. This involves a tremendous amount of work on the part of the industries concerned, the State and Federal regulatory agencies and interested segments of the public.

The Food and Drug Administration has always welcomed participation by consumers and consumer organizations in the formulation of standards. The preliminary consideration of the matter by the Food Standards Committee is particularly adapted to receipt of consumer suggestions, since there is no necessity for a formal presentation. Suggestions are mailed to the committee or given orally in the informal open meetings held by the committee.

The provision for making definitions and standards of identity for foods is closely related to another provision of the Food, Drug and Cosmetic Act which requires that foods for which definitions and standards of identity have not been adopted shall be labeled to show the names of all ingredients. Realizing that a considerable time would elapse before the food standardization program would cover any considerable number of foods, the law provided that the Secretary of Agriculture (who then had the authority now vested in the Federal Security Administrator) might exempt certain foods from this requirement pending the formulation of definitions and standards of identity. The Secretary issued a notice in 1939 in which he listed

(*Turn to page* 158)

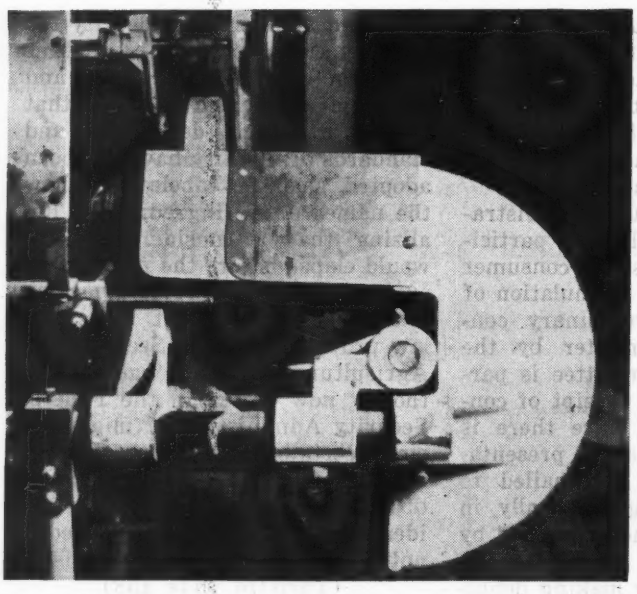
Standards Available

Identity standards have been established for most of the following commodities, and there are quality and fill of container standards for a few.

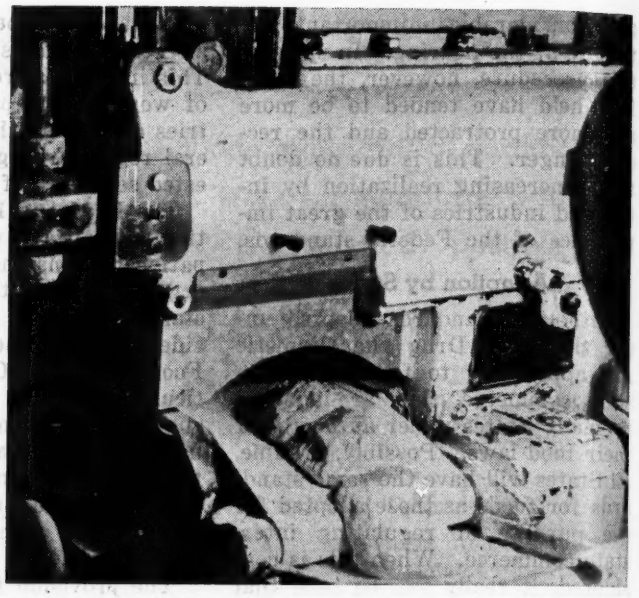
Product	Type of Standard
Alimentary pastes	
Macaroni products	Identity
Milk macaroni products	Identity
Whole-wheat macaroni products	Identity
Wheat and soya macaroni products	Identity
Vegetable macaroni products	Identity
Noodle products	Identity
Wheat and soya noodle products	Identity
Vegetable noodle products	Identity
Apricots, canned	Identity, quality, fill of container
Artichokes, canned	Identity
Asparagus, canned	Identity
Beans, canned green	Identity
Beans, canned lima	Identity
Beans, canned shelled	Identity
Beans, canned wax	Identity
Bean sprouts, canned	Identity
Beet greens, canned	Identity
Beets, canned	Identity
Broccoli, canned	Identity
Brussels sprouts, canned	Identity
Cabbage, canned	Identity
Cacao nibs	Identity
Carrots, canned	Identity
Cauliflower, canned	Identity
Celery, canned	Identity
Cheese, cheddar	Identity
colby	Identity
cottage	Identity
creamed cottage	Identity
cream	Identity
Neufchatel	Identity
washed curd	Identity
Cherries, canned	Identity, quality, fill of container
Chocolate, liquor	Identity
sweet	Identity
milk	Identity
skim milk	Identity
buttermilk	Identity

Product	Type of Standard
Chocolate (continued)	
mixed dairy products coating	Identity
sweet and vegetable fat coating	Identity
Cocoa, breakfast	Identity
low fat	Identity
medium fat	Identity
sweet and vegetable fat coating	Identity
Collards, canned	Identity
Corn, canned field	Identity
canned golden	Identity
canned sweet white	Identity
canned sweet yellow	Identity
Cracked wheat	Identity
Cream	Identity
light	Identity
whipping	Identity
light	Identity
heavy	Identity
Crushed wheat	Identity
Dandelion greens, canned	Identity
Eggs and egg yolks	Identity
dried	Identity
frozen	Identity
liquid	Identity
Farina	Identity
enriched	Identity
Flour (white flour)	Identity
bromated	Identity
bromated whole wheat	Identity
durum	Identity
enriched	Identity
enriched bromated	Identity
enriched self-rising	Identity
phosphated	Identity
self-rising	Identity
whole wheat	Identity
whole durum wheat	Identity
Fruit butters	Identity
Fruit cocktail, canned	Identity, quality, fill of container
Fruit jellies	Identity
Fruit preserves	Identity
Kale, canned	Identity
Milk, condensed with corn sirup	Identity
concentrated	Identity

Product	Type of Standard
Milk (continued)	
dried skim	Identity
evaporated	Identity
sweetened condensed	Identity
Mushrooms, canned	Identity
Mustard greens, canned	Identity
Okra, canned	Identity
Oleomargarine	Identity
Onions, canned	Identity
Oysters, canned	Fill of container
Parsnips, canned	Identity
Peaches, canned	Identity, quality, fill of container
Pears, canned	Identity, quality, fill of container
Peas, canned black-eyed	Identity
canned field	Identity
canned sweet	Identity quality, fill of container
Peppers, canned	Identity
Pimientos, canned	Identity
Potatoes, canned	Identity
Rutabagas, canned	Identity
Salsify, canned	Identity
Semolina	Identity
Shrimp, canned	Fill of container
Spinach, canned	Identity
Swiss chard, canned	Identity
Tomato catsup	Identity
Tomato juice, canned	Identity
canned yellow	Identity
Tomato paste	Identity
Tomato puree	Identity
Tomatoes, canned	Identity quality, fill of container
Truffles, canned	Identity
Turnip greens, canned	Identity
Turnips, canned	Identity



Feed end of dangerous cross-feed on a slicer-wrapper is covered by this guard to protect employees who operate the machine.



Guard in front of shear point under division box of a divider. Arms that raise the box pass the frame as they push the box upward.

Safety Made Practical

Remove the cause and the accident won't happen. How men and machines have been made less hazardous in bakeries is told by a well-known safety engineer. The technics will work in your plant

By R. C. HAVEN, Safety Engineer, Continental Baking Co., New York, N. Y.

ACCIDENT prevention is divided into two parts—Machines and Men. It is not simply a matter of guarding hazardous machinery, as some are prone to believe. It means proper illumination, adequate heat and clean working conditions, as well as safe equipment. It means getting employees to think, to use the right tools, handle equipment correctly, be good housekeepers, wear proper shoes and clothing, be careful of personal hygiene and be considerate of the welfare of others. In short, it means changing their attitudes, in many cases, and building men in other ways to become better employees. All of these activities are definitely a part of the accident prevention program, and they have a tendency to keep employees on the job and reduce the labor turnover.

Safety Devices

But to get down to specific problems and their remedies, let us consider hazards of the baking industry.

Flour Handling—Beginning with flour handling, we know that back and other strains are the most frequent and troublesome accident cases.

There is a knack to lifting a sack of flour. This should be taught to employees when they come on the job. You should not wait until they have learned through the sad experience of an accident. Strains suffered while handling drums, barrels and other heavy containers can be minimized by a small investment in a barrel- or drum-handling truck or by the installation of a chain hoist.

Accidents have occurred frequently in connection with flour-handling equipment. All unguarded pinch points—where gears mesh or where chains meet sprockets—should be covered. Safe methods of cleaning worms and augers in conveyor systems should be employed, such as pulling the main switch and hanging a "Don't Touch" sign on it whlie men are working—or by pulling a fuse controlling the machine.

Mixers—Now let's look at mixers. Here we have a really dangerous machine, if not handled safely. To illustrate, let me quote an article in a New York newspaper:

"Crushed in a dough-mixing machine and in danger of losing both his arms, 14-year-old Joseph Della Fave was putting up a brave fight for his life today at North Hudson Hospital. . . . While helping clean the machine at his uncle's bakery, his right arm struck the switch, starting the . . . blades whirling. His left arm, still in the machine, was caught and his whole body drawn into the mixer and around the blades. His head alone remained outside."

The more modern mixers have electric control buttons which the operator is required to hold down with both hands while the bowl is being opened and the mixing arms are moving. Where the old type of mixer is used, if these buttons cannot be installed, the problem is a matter of working out some other safety device or one of education and supervision.

Many painful strains and hand injuries have occurred in the mixing room while handling dough troughs. There is no way of guarding the troughs, so here again it is a matter of education. An employee will learn by mashing his hand or breaking his fingers—but that is not the kind of education to which we are referring.

Dividers—The next operation is the divider. There are so many different types in use that one could hardly describe the many dangerous points. The manufacturers did not have an eye for safety when they designed these older types. How many men do we know who have lost all or parts of their fingers when cleaning the oil holes in the knives. When the elongated holes in them register, the finger goes right on through—*then off it comes!*

Divider manufacturers now are decreasing the size of the holes, making it impossible for a person to put his fingers into them.* For the old type of knives still in use, a piece of drill rod—or, better still, a quarter-inch stainless steel rod—inserted in these holes will do the trick.

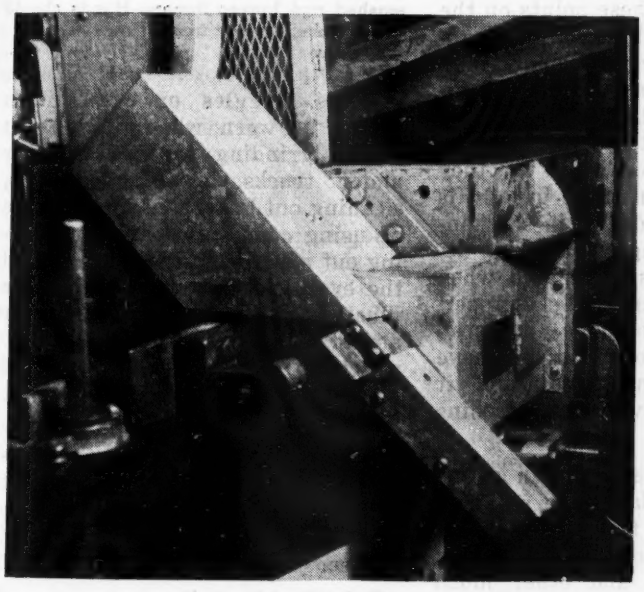
Then there is a shear point underneath the division box (both ends) where the arms that raise the box pass the frame as they push the box upward. Another point is the elongated hole in the arm that actuates the knives at the back of the machine.

These are a few hazards, and each divider should be closely examined and a guard put over every place where an employee can get hurt. Guards will not always prevent an injury, but they all help. No machine can be made foolproof if there is a fool operating it.

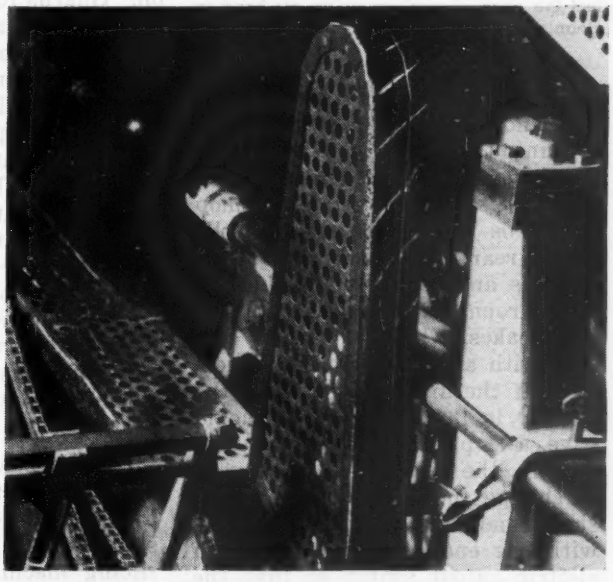
Rounders — The rounder is about the only machine that is usually cleaned while in motion. The cleaning operation is the most dangerous thing about it. Here the operator should be taught the proper way to hold the scraper.

Molders—The molder presents a different story again. The hopper

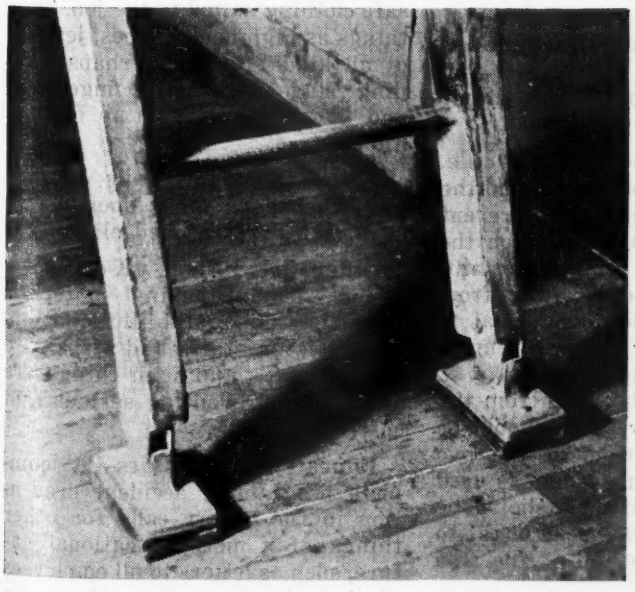
*Other machinery manufacturers, too, are changing the designs of their machines to insure greater safety.



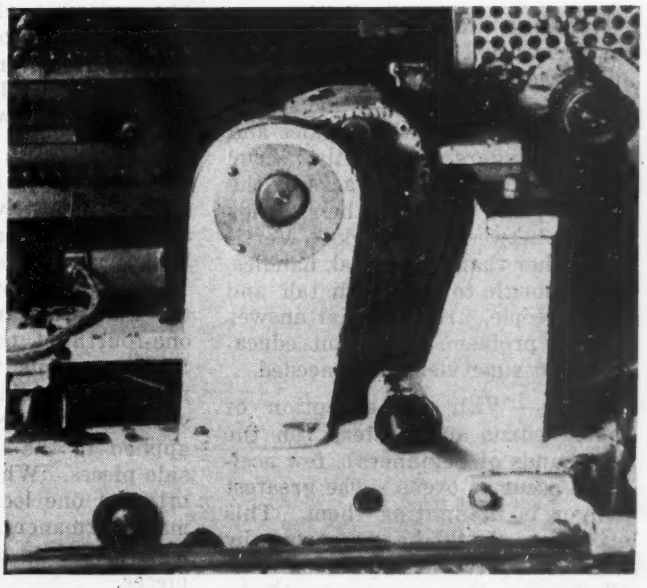
Guard over gears and ratchet on a wrapping machine.



Guards over chain drives on wrapping machine.



Safety shoes keep ladder from slipping and prevent bad falls. A ladder used often at one location should be made permanent or have hooks on tops of side pieces.



Circular guard plate closes large opening in loose-wrap attachment on a wrapping machine. Part of guard over chain drive is seen at upper right.

One-piece, high-vision plastic goggles protect the eyes of workers using air hose to clean machines.

at the top of most machines is not high enough to prevent a hand getting into the intake rolls just below. The hopper should be built up several inches. Also, a miniature mop should be used to grease the rolls at the rear of the machine. Then there is an opening at the bottom of the round gear housing, on certain makes, which should be covered with a half-inch-mesh screen. Also, if the drum shaft (with the keyway in it) protrudes, it should have a cup guard over the end. Finally, the wrench or crank used to change the width of the drum should hang on the molder frame, with one end of it resting on an electric cutout switch so that the molder will not run when the crank is removed.

Handling Racks — Injuries are comparatively few in "panning" and "racking," but handling the racks themselves is a prolific source of accidents. Mashed knuckles and broken fingers frequently occur when workers hold the racks by the corner posts and get their hands caught between two racks. Vertical, rather than horizontal, handles, long enough to suit both tall and short people, are a partial answer to this problem. Constant education and supervision are needed.

Ovens—With the exception of minor burns and blisters (on the soft hands of beginners), few accidents occur at ovens. The greatest danger is in lighting them. This operation should be done only by authorized, well-trained persons. Obviously, the ovens should be watched to see that burners do not go out, allowing an accumulation of gas. Modern ovens are protected in this regard.

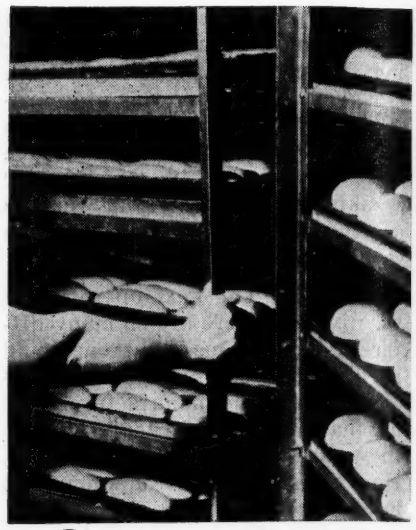
Proof boxes present no real problem, although slipping hazards sometimes develop and knuckles get bruised as racks are wheeled into these boxes.

Slicing-wrapping machines are a source of accidents. Here too, we find many types, so it is difficult to point out all the hazardous spots. But it goes without saying that all pinch points should be covered. These can be found at gears, sprockets and chains, V-belt drives, both ends of the cross-feed, front and back of the loose-wrap attachment, flight-rod chains over sprockets, discharge ends of the two conveyor belts on the wrapper, and so on. Guards for these points on the older type of machine must be provided by the bakery. Usually, only two guards come as standard equipment. One is the quarter-round guard that protects the worker from the transfer arms as they drop down. Then there usually is a spring locking device in the handle of the starting lever. This device sometimes is eliminated when hooking the slicer to the wrapper. This should not be done. Have all the stop levers you want, but have only one starting lever, and it should be locked when the machine is stopped.

Falls in bakeries are high in frequency. Most plants are going to highly polished floors. The very slippery spots, such as those around slicing machines and other much used places, can be eliminated by the use of mats or nonskid paint. The wearing of low, flat-heeled shoes also minimizes slipping accidents. However, where we find highly polished floors we should not be surprised if we have falls.

Ladders are a source of trouble. The proper type for the job and the correct use of it will help to prevent accidents. The angle at which the ladder stands is very important. The bottom should be away from the wall a distance about equal to one-fourth of the ladder's length. In other words, the bottom of a 12 ft. ladder should be 3 ft. from the wall. Then safety shoes should be applied to the bottom of the two side pieces. When a ladder is used often at one location, it should be made permanent, or hooks ought to be attached to the top of the side pieces.

Eye accidents are frequent in the industry. To prevent painful



Wrong way to handle a rack, resulting in mashed and broken fingers. Hands should grasp crosspieces at front of rack.

injuries, goggles or eye shields should be worn when doing such jobs as grinding, welding, working under trucks, cleaning ceilings, cleaning out boilers, handling ashes or using compressed air for blowing out machinery. We have found the eyeshield shown in one of the illustrations to be satisfactory for almost all jobs except welding—which, of course, calls for colored glass.

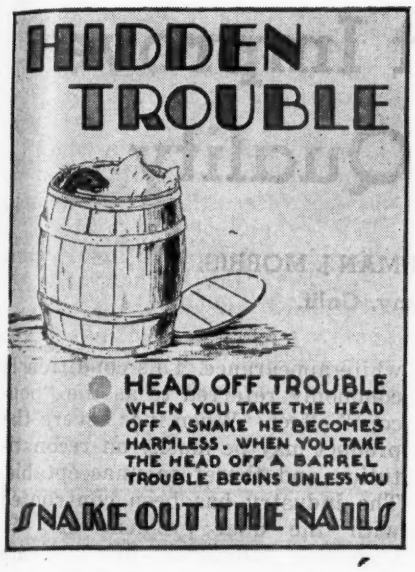
Gas and Dust—Regulation gas masks should be worn for repairs to the ammonia machine. A dust mask is needed for the worker who is allergic to flour dust, which, of course, is nontoxic.

Safe Clothing—Employees should be required to wear uniforms or safe clothing suited to the job. Such things as high-heeled shoes, jewelry of all kinds (except perhaps wedding rings) imitation fingernails and flowing hair ought to be prohibited.

Nails—Removing nails or staples when a barrel is opened will save many a scratched elbow.

Other Precautions—Keeping aisles clear, stacking materials properly, adequate illumination, handrails on stairs and steps, fire extinguishers and such things are all aids in preventing serious and costly accidents.

Educational Technics—A complete program of accident prevention in the bakery calls for other things of a more educational nature, such as letters to all employees at their homes, occasional motion pictures and group meetings. And don't forget your bulletin boards.


HIDDEN TROUBLE
HEAD OFF TROUBLE
WHEN YOU TAKE THE HEAD OFF A SNAKE HE BECOMES HARMLESS. WHEN YOU TAKE THE HEAD OFF A BARREL TROUBLE BEGINS UNLESS YOU
SNAKE OUT THE NAILS

Removing nails or staples when a barrel is opened will save many a scratched elbow, as this poster so eloquently tells.

An appropriate poster will put a safety idea across more quickly and make a greater impression on the employee than a sermon. Locate the board in the most conspicuous place—near a drinking fountain or time clock—never in stairways. Use homemade posters and bulletins. Put up one bulletin or poster at a time. Leave the board blank at times. Delegate one person to see that the board is used correctly. All these are needed to educate employees and to keep them interested.

Reducing Lost Time—Absenteeism became a problem when people began to make good wages. It was also found that some employees were laying off work from one to five days for the most minor accident. To meet this situation, a contest to prevent lost-time accidents was devised. We developed a large score sheet showing airplanes flying through bursting shells. If any employee has a lost-time accident, a plane comes down. War bonds are drawn for, or war saving stamps given, if the bakery goes through the month with a perfect score. An appropriate prize will be given the winning bakery. During the first three months, lost-time accidents were reduced 43 percent.

Safety With Trucks

Conservation of manpower forced the use of safer methods in the garage. Men were made to wear goggles or eye shields, keep the mushroom heads of chisels ground off, keep grease off the floor to prevent falls, use greater care when jacking up trucks.

Preventing auto accidents has been made more difficult since industry has had to take what's left insofar as manpower is concerned. More time was taken to get acquainted with an applicant's past record. Mental and driving tests became more important, and the doctor's physical examination was scrutinized with greater care, although some of the requirements had to be lowered.

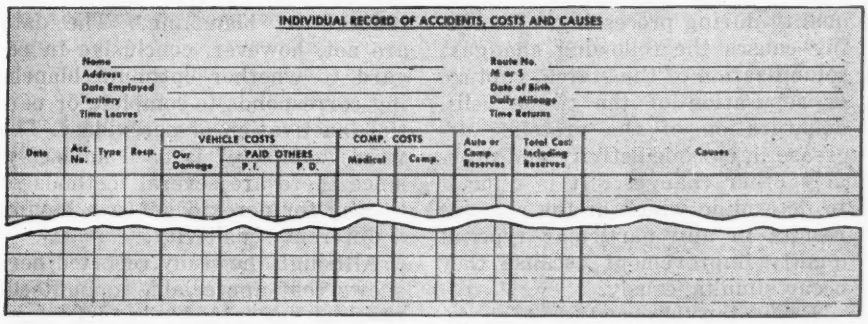
The new driver's safety education begins with his being instructed as to the company's responsibility, his personal responsibility, the driving rules and technics of safe driving.

Then he was told about our award system. With a good accident record, he would receive bronze, silver, gold and diamond-studded gold pins—and, eventually, a beautiful pocket watch—as recognition of a hard job well done. (More than 20 percent of our driver-salesmen have driven a company truck without a chargeable accident for more than 12 years. And even the most minor accident may be a chargeable one.)

Where a bakery was found to have an unusually high truck-accident frequency, a contest lasting six months would be started, the winning team receiving appropriate prizes. This procedure nearly always got them back on the beam.

Of course, the keeping of accurate accident records has been necessary. Not only is this done in the main office, but each foreman and supervisor has a folder containing a sheet for each employee. These sheets carry all the information needed to talk "convincingly" to the individual about his accidents.

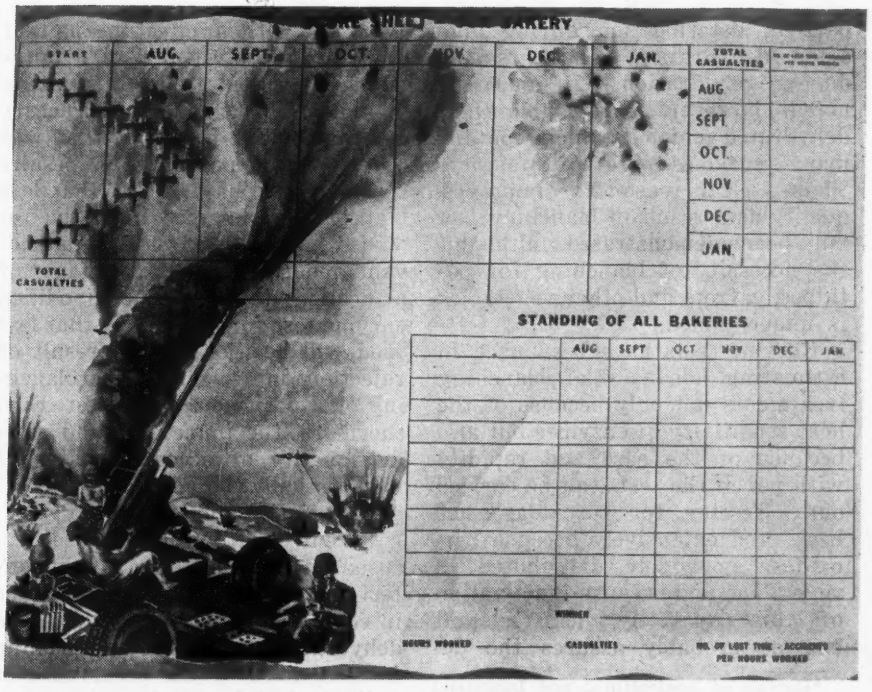
We in the baking industry have met the safety situation by careful selection of employees, intensified training, better supervision, contests, awards, accurate records and safety devices.


INDIVIDUAL RECORD OF ACCIDENTS, COSTS AND CAUSES

Name
Address
Date Employed
Territory
Time Leaves
Route No.
M or S
Date of Birth
Daily Mileage
Time Returns

Date	Acc. No.	Type	Resp.	VEHICLE COSTS: Our Damage	PAID OTHERS: P. I.	PAID OTHERS: P. D.	COMP. COSTS: Medical	COMP. COSTS: Comp.	Auto or Comp. Reserves	Total Cost Including Reserves	Causes

Accident record sheet for individual truck drivers. It accommodates all the information needed to talk "convincingly" to a driver about his accidents.



Score sheet to reduce lost-time accidents. A lost-time accident brings a plane down (they are toy plastic pinup planes).

Severe Blanch Doesn't Improve Dehydrated Potato Quality

By HORACE CAMPBELL, HANS LINEWEAVER and HERMAN J. MORRIS,
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That the blanching treatment ordinarily used on white potatoes can be moderated and a certain amount of peroxidase activity tolerated is indicated by this study. This will help to solve problem of overblanching

THE advantages of blanching potatoes prior to dehydration include not only improvements in storage and rehydration characteristics[3] but also a reduction in loss of quality during processing. Blanching causes the following changes: solubilization of the starch, rupture or separation of the tissue cells, denaturation of the proteins, decrease in enzyme activity and probably other changes. It is difficult to determine which of the changes results in any particular type of quality improvement because they occur simultaneously.

From the observation that enzyme destruction and quality improvement frequently seem to parallel, investigators have assumed that enzymes play an important part in deterioration during and after dehydration, and possibly during rehydration. It must be noted, however, that unblanched dehydrated onions, which contain many enzymes, are satisfactory. Thus a clear reason for improved quality as a result of blanching has not been demonstrated, although the necessity of blanching for potatoes, carrots and other vegetables is unquestioned.

Enzyme tests have been used in estimating adequacy of blanching treatments not only because of the heat sensitivity of enzymes but also because of the ease and rapidity with which the tests can be carried out. Testing for peroxidase has been used extensively because peroxidase is widely distributed in vegetables and because inactivation of this relatively heat-resistant enzyme probably assures the destruction of detrimental enzymes in the raw product. Some investigators have reported improved quality for several dehydrated vegetables when enzyme activity was reduced by blanching. The data are not, however, conclusive in regard to whether optimum blanching corresponds to complete or partial inactivation of peroxidase. The word "complete" is used advisedly, since there are several methods of testing for peroxidase, each having a different sensitivity.

Although the study reported here shows that appreciable amounts of residual peroxidase do not cause deterioration during dehydration or storage, it is necessary nevertheless to blanch potatoes uniformly. The observation that residual peroxidase is without effect means that the margin between a safe minimum blanch and a blanch resulting in undesirable change in structure and composition is greater than was previously supposed. The results reported here have shown that less blanching than was formerly required can be used safely and advantageously. The advantage of a decreased blanch and modified enzyme test for potatoes is that less food will be wasted as a result of rejection due to either overblanching or a positive enzyme test. Furthermore, the immediate and storage quality of accepted materials may actually be higher, both organoleptically and nutritionally.

Recently, attention has been focused on overblanching and its effect on retention of form and shape in reconstituted strips and dice. In dehydrated potatoes, overblanching is recognized by the occurrence of individual strips or dice characterized by a porous texture and opaque white appearance. This condition is commonly referred to as the "popcorn" effect. When it is severe the product may be mushy on reconstitution and therefore unacceptable. The industry has been confronted with the dual problem of (1) blanching sufficiently to inactivate the peroxidase system and (2) producing a product that is not overblanched. It will be shown that the "popcorn" effect is partially due to the degree of blanching and that potatoes vary in their sensitivity to overblanching, as evidenced by this effect.

Experimental

In the study reported here, U. S. No. 1 Russet Burbank potatoes from the Klamath, Ore., district were used. The raw stock was thoroughly mixed and divided into six lots. Each lot was peeled in a batch abrasive peeler, trimmed to remove defective portions and skin missed by the peeler, cut into 3/8-in. cubes, washed with water and thoroughly mixed.

The lots were blanched in flowing steam in a humpback belt blancher at 212 deg. F., at a loading of 1 lb. per square foot, for 1, 2, 3, 4, 7 and 10 minutes. The blanching operation was followed by washing with cold water to stop blanching action and to remove loose and solubilized starch on surfaces of the pieces.

Dehydration was accomplished under two-stage conditions at dry-bulb temperatures not exceeding 155 deg. F. in the primary stage nor 145 deg. F. in the secondary. In the primary stage the wet-bulb temperature was 110 deg. F. and in the secondary, 90 deg. F. Total drying time was 14 hours, and the moisture content of the dried material ranged from 4.7 to 7.0 percent. The dried product from each lot was divided into 3 portions and packed in wax-sealed friction-top cans for storage at 90 deg. F., 70 to 75 deg. F., and –30 deg. F.

Moisture determinations were made on ground samples passing a 2-mm. screen by determination of

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the loss in weight after the material had been held in a vacuum oven for 16 hours at 70 deg. F. at a pressure of about 20 mm. of mercury.

Edible quality was evaluated after rehydrating and cooking under standardized conditions by a group of 9 to 10 experienced judges. The samples were scored for color, flavor, taste and texture. The scores reported represent the average of opinions of the judges. The average scores, together with their standard errors, are presented in Table II. In the interest of conserving space, the data for 70 to 75 deg. F. storage have been omitted, since the results were not significantly different from those for the material stored at –30 deg. F. The samples that received the 10-minute blanch were considered as the controls, and unless the difference between the average score of the control and that of the sample was equal to or greater than 2.1 times the standard error of the difference, it was not considered significant. (See columns *t* in Table II.)

The peroxidase test procedure used was similar to that used by processors and inspectors during 1943.

Five grams of dehydrated material in a 100-ml. beaker was covered with 50 ml. of water and allowed to rehydrate for one hour. One milliliter of a 1 percent alcoholic guaiacol solution and 2 drops of freshly prepared 3 percent H_2O_2 were added and the contents of the beaker stirred.

After 15 minutes, and again after 2 hours, the colors of the solution and the solid pieces were scored subjectively by three observers. The values are based on an arbitrary scale of 1 to 100, but the numbers do not refer to percentage of residual peroxidase with salt solution, and determination of the activity quantitatively showed that a value of 30 to 40 for the solids (observations after 15 minutes) corresponded to about 1 percent of the activity in raw potatoes. The increase in the intensity of color with time (compare observations after 2 hours with those after 15 minutes, Table I) demonstrates the necessity for considering the time of the reaction as well as the amount of color formed during the reaction in order to evaluate the relative peroxidase activity of different materials. This point needs emphasis, because too frequently it is forgotten that peroxidase is a catalyst and hence the rate of reaction and not the amount of reaction product is the best index of the enzyme content of a substance.

A score of 40 for the solid pieces means that almost all of the pieces showed some color, although the total surface of each piece may not have been colored; a score of 20 corresponds to coloration of about 90 percent of the pieces; a score of 10, to about 50 percent; a score of 5, to about 10 percent; and a score of 1, to a very slight coloration on an occasional piece. (Scores above 40 correspond to coloration so intense that it would be very difficult to estimate differences.) This analysis of the significance of activity values is very approximate, since each observer subjectively, rather than analytically, estimates a score by inspection of the coloration. The average deviation from the average scores assigned by the three observers was less than 25 percent.

TABLE I—Relation of Blanching Time, Storage Temperature and Time, and Peroxidase Scores (Guaiacol Test) of Dehydrated White Potatoes.

*Blanching time, minutes	Relative peroxidase activity of solid pieces after storage: 1 week		8 weeks		32 weeks	
	15 min.	2 hr.	15 min.	2 hr.	15 min.	2 hr.
	Stored at —30° F.					
1	35	40	16	37	14	38
2	13	17	5	15	4	12
3	4	5	1	3	1	2
4	1	1	0	1	0	0
	Stored at 70–75° F.					
1	35	40	9	23	4	12
2	11	12	4	2	1	3
3	1	2	1	2	0	0
4	1	1	0	1	0	0
	Stored at 90° F.					
1	28	36	6	16	0	5
2	12	13	5	7	0	2
3	3	4	1	2	0	1
4	2	2	0	0	0	0

*Samples blanched 7 and 10 minutes gave 0 scores under all conditions and at all times.

TABLE II—Effect of Blanching Treatment of Edible Quality Scores of Dehydrated White Potatoes Stored at Two Different Temperatures for One Year.

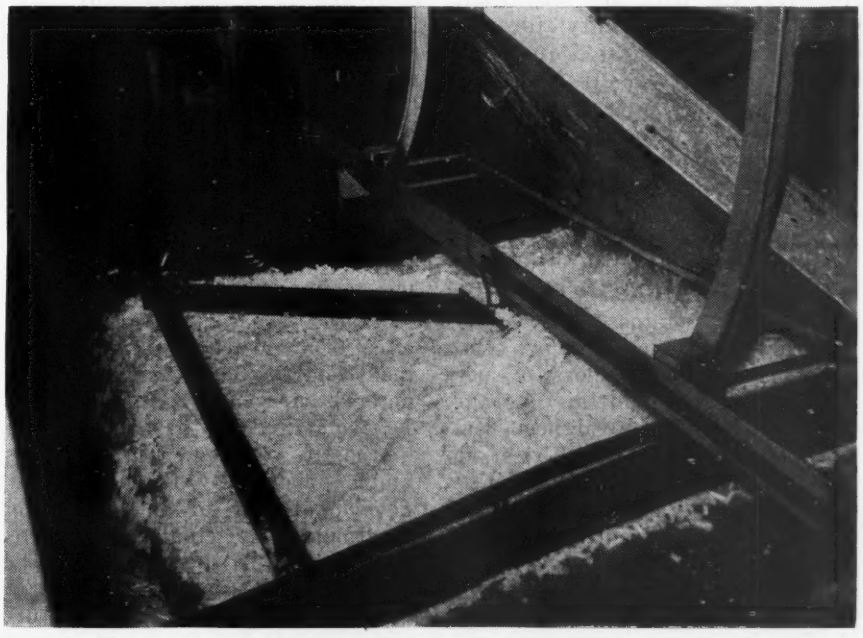
Blanch time, minutes	Storage at —30° F. Score*	*t***	Storage at 90° F. Score	*t*
	Color.			
1	67 ± 4.2	0	33 ± 4.5	0.5
2	56 ± 4.9	1.8	39 ± 4.3	0.5
3	53 ± 2.1	3.5	39 ± 4.2	0.5
4	64 ± 13.7	0.2	36 ± 4.5	0
7	69 ± 4.6	0.4	47 ± 3.3	2.0
10	67 ± 3.4	..	56 ± 4.5	..
	Flavor			
1	56 ± 5.6	1.6	58 ± 8.5	1.1
2	64 ± 5.9	0.5	50 ± 8.0	0.3
3	67 ± 3.4	0.2	53 ± 6.3	0.7
4	72 ± 5.4	0.3	50 ± 6.6	0.4
7	73 ± 5.3	0.4	53 ± 4.7	0.8
10	69 ± 7.5	..	47 ± 5.3	..
	Taste			
1	67 ± 7.2	0	53 ± 6.3	0.5
2	67 ± 5.3	0	58 ± 3.4	0
3	67 ± 5.3	0	56 ± 5.0	0.2
4	75 ± 4.2	1.1	61 ± 6.3	0.8
7	69 ± 7.5	0.2	58 ± 7.5	0
10	67 ± 6.8	..	58 ± 7.5	..
	Texture			
1	69 ± 5.6	0.5	58 ± 8.6	0
2	64 ± 12.0	0.7	61 ± 7.5	0.3
3	67 ± 5.3	0.8	64 ± 5.9	0.6
4	69 ± 7.5	0.4	56 ± 6.5	0.2
7	69 ± 6.2	0.5	64 ± 5.9	0.6
10	73 ± 5.3	..	58 ± 7.5	..

*The numerical scores can be interpreted as follows: 100-87.6, excellent; 87.5-75.1, very good; 75.0-62.6, good; 62.5-50.1, fair; 50.0-37.6, poor but acceptable; 37.5-25.1, very poor; 25 or below, unacceptable.

**The values for *t* are determined as follows: The difference between mean scores for 10 minutes and *X* minutes of blanching is divided by the estimated standard error of the difference.[3]

Laboratory-prepared Potatoes

The effects of blanching treatment and storage on peroxidase activity are shown in Table I. It must be remembered that exactly the



Diced potatoes on the way to a steam blancher in a potato dehydration plant. To protect the quality of this raw material, blanching is necessary to inactivate the enzymes. But studies have shown that the customary blanching treatment can be moderated to avoid overblanching with no impairment of quality.

CONCLUSIONS

1. From the results of this study it has been concluded that storage quality of dehydrated white potatoes is not improved by severe blanching or by completely inactivating the peroxidase enzyme system. The presence of residual peroxidase in the dehydrated product, even to the extent found in the potatoes blanched for the shortest time, is of little moment. *Potatoes blanched for 10 minutes had no better keeping quality than potatoes blanched for 1 or 2 minutes.*

***This does not mean, however, that potatoes to be dehydrated do not need to be blanched, but rather that it is safe to reduce the extent of blanching.* It must be remembered that the efficiency of blanching equipment varies and therefore the time required to effect equivalent amounts of blanching will vary.**

2. Below 70 deg. F., temperature does not markedly affect rate of quality deterioration of dehydrated potatoes during storage. A storage temperature as high as 90 deg. F. for long periods of time is undesirable, especially from the standpoint of color change.

3. The most marked effect of storage at 90 deg. F. was on color. The formation of water-soluble pigment appeared to be related to moisture content, thus suggesting that when dehydrated potatoes are to be stored at temperatures higher than 70 deg. F., the moisture content should be somewhat below the present specification level of 7 percent.

4. The problem of overblanching is associated with characteristics of the raw material. Some lots of potatoes are more subject to overblanching or the so-called "popcorn" effect than others. From the work of Freeman, the "popcorn" effect appears to be related to the degree of mealiness in the raw stock. The higher the degree of mealiness, the higher was the degree of popcorn effect. *If the relation between mealiness and the popcorn effect is a true one, and there is no reason to doubt it at present, then exceptionally mealy potatoes are not suitable for dehydration purposes.*

same relation between blanching time and peroxidase activity would probably not exist for materials processed in different dehydration plants. Furthermore, the relationship will vary somewhat with the sample or variety of raw stock used. However, the data are significant with respect to quality for the samples of dehydrated potatoes tested and reported. In the range of relative peroxidase values reported in Table I there was little, if any, correlation between values estimated after either the 15-minute or the 2-hour period and quality retention during storage—that is, in the range of peroxidase activity below 1 or 2 percent of the activity in the raw undried potatoes.

Although Table I shows that there is appreciable loss of peroxidase activity during storage, particularly at the highest temperature, the peroxidase test on material given the least blanch remained strongly positive for several months. Thus peroxidase was not only present in the potatoes immediately after dehydration but it was also present, and potentially active, during storage.

Retention of natural color, flavor, taste and texture during storage of dehydrated potatoes blanched different amounts.—Table II shows no consistent relationship between blanching time (and hence peroxidase activity, Table I) and retention of desirable color, flavor, taste and texture during a year's storage of dehydrated potatoes at –30 deg. or 90 deg. F. It is noteworthy that, in spite of the fact that the moisture content was higher for the material blanched the shortest times, no trend in quality with blanching treatment or peroxidase activity was evident. The initial moisture content of the dehydrated potatoes ranged from 4.7 to 7.0 percent (Table V). The higher moisture content of the material blanched a short time would have increased rather than decreased the effect of a deficient blanching treatment on the quality scores. Since deterioration occurred at 90 deg. F., compared with the controls stored at –30 deg. F., there was ample opportunity for a trend to develop if any of the blanching treatments was actually inadequate.

It is evident, therefore, that the keeping properties of dehydrated white potatoes in the moisture range of 5 to 7 or 8 percent are not improved by blanching until peroxidase is completely destroyed, as compared with blanching until about 1 percent of the peroxidase activity remains in the dried product. It is gratifying to know that the blanching requirements specified in the absence of adequate storage data were on the safe side. Present data, however, should make it safe to adopt a test, or place a tolerance on the present test, that will correspond to less severe blanching. It will, of course, be necessary to employ an enzyme test or some other procedure for evaluating blanching because of the differing efficiencies of blanching equipment. Furthermore, blanching should always be in excess of the minimum to allow for variations in the raw material.

Effect of storage temperature on the retention of quality of dehydrated potatoes.—Since there was no significant variation in retention

(*Turn to page* 186)

TABLE III—Effect of Storage Temperature on the Average Quality Scores of Dehydrated White Potatoes Stored for One Year.

	Temperature			
	–30 deg.		90 deg.	
	Score	Adj.	Score	Adj.
Color	63	Good	38	Poor
Flavor	67	Good	52	Fair
Taste	69	Good	57	Fair
Texture	69	Good	60	Fair
Average	67	Good	52	Fair

TABLE IV—Light Transmission in Water Extracts of Dehydrated Potatoes Stored for One Year.

Blanch time, minutes	Percent light transmission with storage at:		
	—30° F.	70-75° F.	90° F.
1	85.9	77.3	44.6
2	87.0	78.8	46.5
3	81.0	78.5	57.4
4	80.0	77.0	58.0
7	81.5	80.6	68.5
10	81.1	78.0	56.6

TABLE V—Effect of Blanching Treatment on Moisture Content and Light Transmission by Water Extracts of Dehydrated Potatoes Stored at 90 deg. F.

Blanching time, minutes	Moisture after dehydration Percent	Average moisture over 32-week period Percent	Light transmission in water extract after one year Percent
1	7.0	7.9	44.6
2	6.2	7.3	46.5
3	6.0	6.9	57.4
4	6.3	7.0	58.0
10	5.0	6.3	56.6
7	4.7	6.0	68.5

TABLE VI—Sensitivity of Different Lots of Russet Burbank Potatoes to Development of the "Popcorn" Effect (Diced Form).

Lot No.	Source	Blanching time, minutes	"Popcorn" percentage By weight	By count
1	Oregon	3	9.9	8.6
2	Idaho	3	30.4	27.8
1	Oregon	4	...	11.0
2	Idaho	4	80.8	82.2
3	Oregon	5	0.0	0.0

Rolling-Rod Mill Passes WPB Tests

Simple in construction and operation, it produces a peeled rice which retains most of the bran and is rich in vitamins and minerals. Also, breakage is low

BROWN RICE milled in the rolling-rod (Earle) peeler retains a high percentage of thiamine, fats and minerals, because very little bran is removed. In addition, breakage of the rice kernel is low, and very little of the germ is removed in the process. These are the conclusions of those who tested the mill for WPB's office of Production Research and Development.

This rice peeler is simple in construction and operation. It is a tubular mill about 2 ft. in diameter and 10 ft. long, lined with rubber about ¼ in. thick. Inside of the mill are five or six 10-ft. steel rods, some 2⅛ in. in diameter and some 2¼ in. in diameter. They lay loosely on the lower side of the cylinder and roll freely as the cylinder rotates. The rods are lightly knurled, and each has three smooth steel bands around it, these bands preventing the knurled portions of adjacent rods from coming in contact. The rods rotate at different speeds, both in relation to themselves and to the mill shell, which turns at 41 r. p. m. They do not cascade. Neither have they any independent source of power. Their motion is imparted by the rotating drum, and action on the rice is merely a rubbing motion. In this way, fewer kernels are broken than in the regular milling processes. The amount of bran removed depends on the length of time the rice is rubbed and the variety of the rice used.

About 2 hp. is required to drive the mill, and its capacity is about 1,000 lb. per hour. The capacity, however, is readily varied by changing the slope of the cylinder (see table), and the peeler can be operated in series and in batteries.

Test operations with the peeler indicate that one improvement is needed—a means of removing the bran as it accumulates in the drum.

Tests in which the amount of rice kernel breakage was determined indicate that for 0.5 percent bran removal, the breakage in peeling will be approximately 4 percent; for 1.0 percent bran removal, breakage will be approximately 6½ percent. These test data are not to be considered as final.

Studies on rancidity still are in progress, but from the data on hand it is concluded that rancidity will develop in the peeled rice since much of the fat remains after peeling. This will affect storage life.

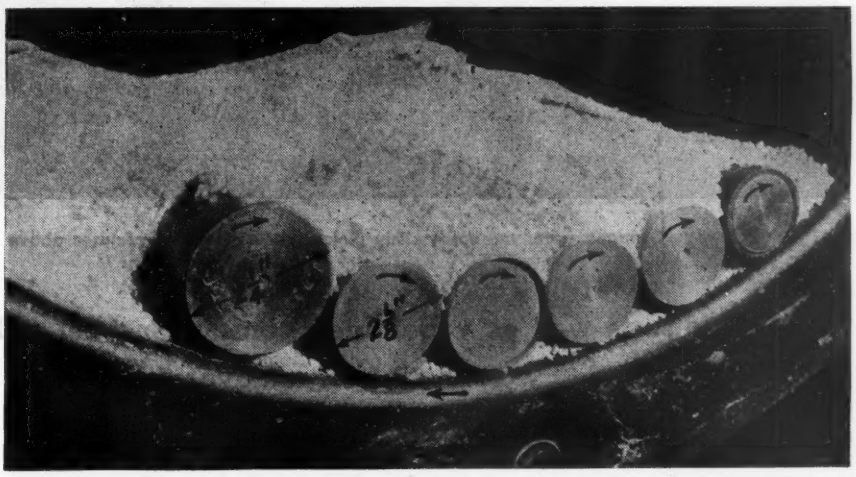
The attractiveness of brown rice is definitely improved when it is slightly brushed after peeling. This causes, however, some loss in thiamine content. Peeled Zenith rice with a thiamine content of 4.31 ug/g was reduced to 3.12 ug/g after brushing, which is a loss of 27.6 percent.

Effect of Slope on Capacity and Bran Removal*

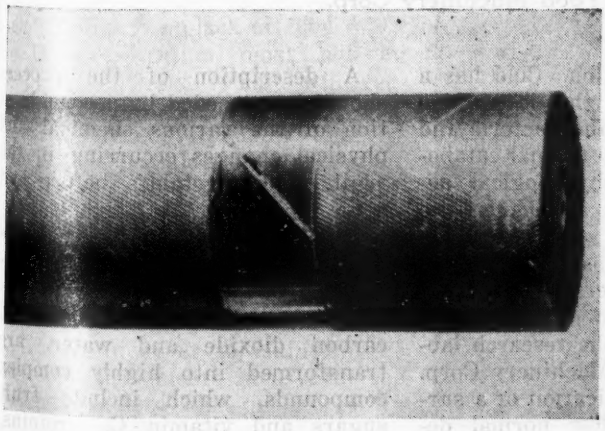
(Test made on Zenith variety)

Slope inches in 10 ft.	Capacity (lb. per min.)	Meter hp.	Percent bran removal
4 1/16	29.4	...	0.31
3 11/16	17.5	...	0.46
3 7/16	13.1	2.01	0.61
3 3/16	11.9	2.01	0.74
2 13/16	9.5	...	1.02
2 1/2	1.6	...	3.55

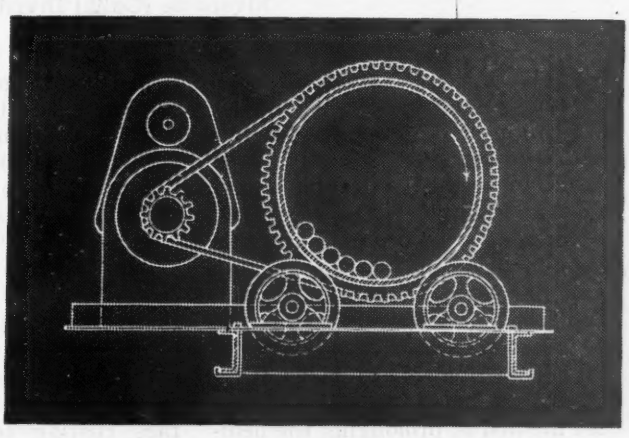
*Cylinder rotated at 41 r. p. m. in all cases.



Rolling-rod mill in action on rice (end of drum removed).

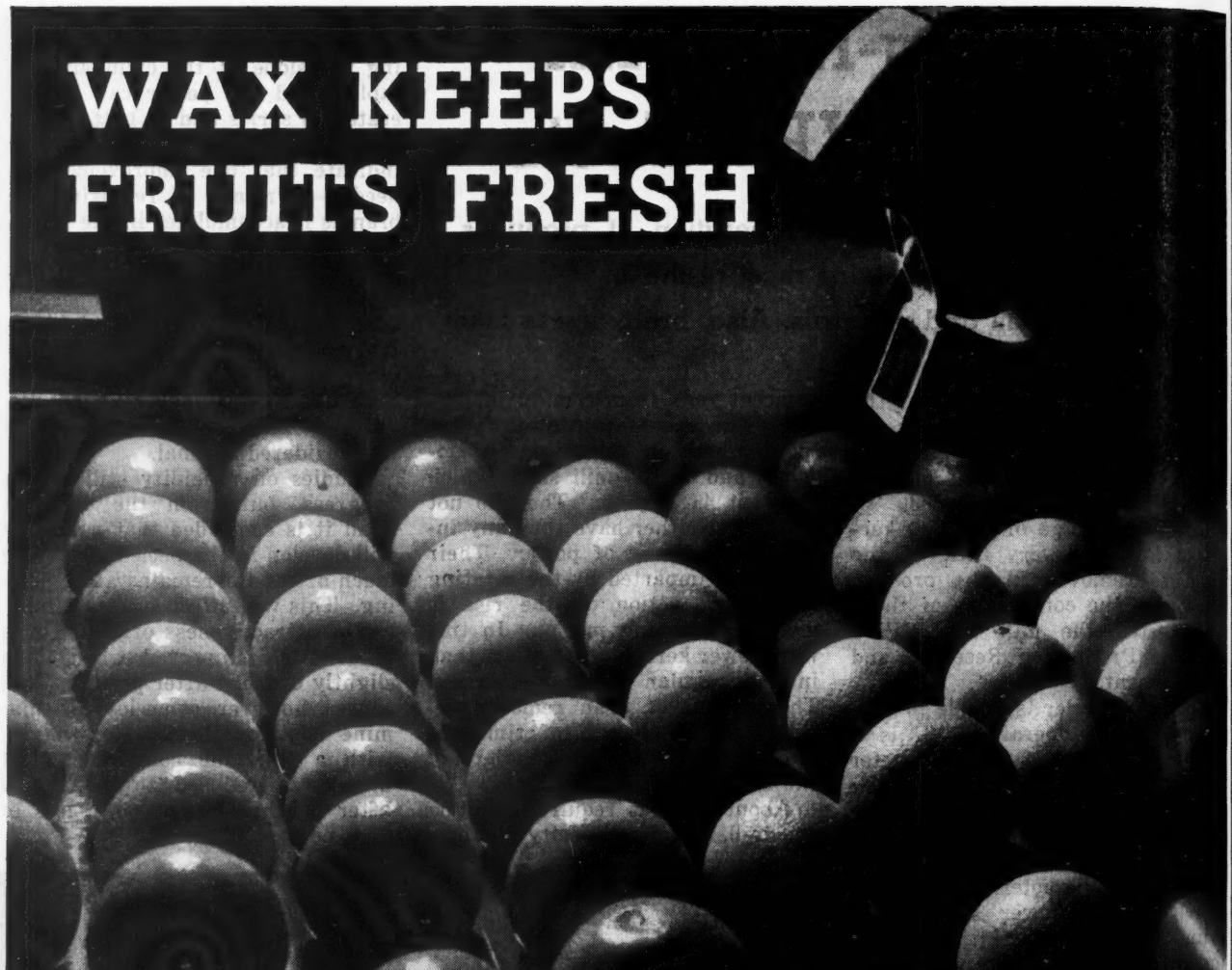


Knurled milling rod has smooth separating bands.



Cross section of peeler and driving mechanism.

WAX KEEPS FRUITS FRESH



Oranges under the spray. This picture shows the air apertures above and below the spray nozzle.

Fruits, as well as vegetables, come to market field-fresh when protected with the right wax coating. The Flavorseal process insures the correct coating, properly applied, for each type of fruit and vegetable treated

By ARTHUR F. KALMAR, Chief of the Research Department
Riverside (Calif.) Division, Food Machinery Corp.

NUTRITIONAL values of fresh fruits and vegetables place them high on the list of consumer food requirements. However, the rapid technical progress being made in canning, quick freezing, dehydrating and concentrating foods is bringing the day nearer when processed foods will be on a close footing with field-fresh fruits and vegetables in food value.

Where shipment to market requires long hauls, the most widely used method of prolonging the field-fresh condition of fruits and vegetables is refrigeration. Cold has a retarding effect on the destructive activities of fungi and bacteria and also slows down the normal catabolic processes of physiological deterioration. As a supplement to refrigeration for some products and as a close substitute for refrigeration for others, a treatment for fresh fruits and vegetables has been developed in the research laboratories of Food Machinery Corp. It involves the application of a surface coating to slow normal decomposition and dehydration.

A description of the process should be preceded by a consideration of the various chemical and physical changes occurring in the fruits and vegetables before and after harvesting.

During the growing period, the fruit builds up a storehouse of organic food materials. By photosynthesis, the simple raw materials, carbon dioxide and water, are transformed into highly complex compounds, which include fruit sugars and vitamin C. Proteins, fruit acids and oils are also syn-

thesized by utilizing the mineral salts absorbed by the roots from the soil and the organic compounds which have been prefabricated by photosynthesis.

After the fruit is picked, it continues to live, but the physiological process is changed to a destructive or catabolic one. The food elements that were synthesized into chemical energy—sugars, acids, proteins, and so on—are now utilized as the only source of energy for the maintenance of its life. The sugars are slowly broken down into the simple substances, water and carbon dioxide, through the action of atmospheric oxygen. By the process known as aerobic respiration, oxygen is inhaled and carbon dioxide and moisture are exhaled through microscopically small "pores" dispersed over the entire skin surface. (An orange has approximately 9,000 pores per square inch of skin surface through which this gas exchange goes on.)

Another biochemical process associated with the physiological decline of picked fruit is transpiration, or the normal drying up of the fruit through loss of moisture. Fruits and vegetables are provided with a thin covering of amorphous waxy material secreted from the epidermal cells, called the cuticle, as protection from desiccation. Fruits having a heavy cuticle generally lose less weight in a given length of time than those with a thin cuticle. Nectarines, for example, will shrivel and dry up much more rapidly than oranges. Approximately 80 percent of the water loss in an orange is due to transpiration, while the remaining 20 percent loss is from respiration.

The life of the fruit depends on how long its supply of stored foods will hold out against oxidation, because, as the organic foods are oxidized, the fruit becomes shriveled, discolored and lacking in flavor. It slowly dies from lack of food.

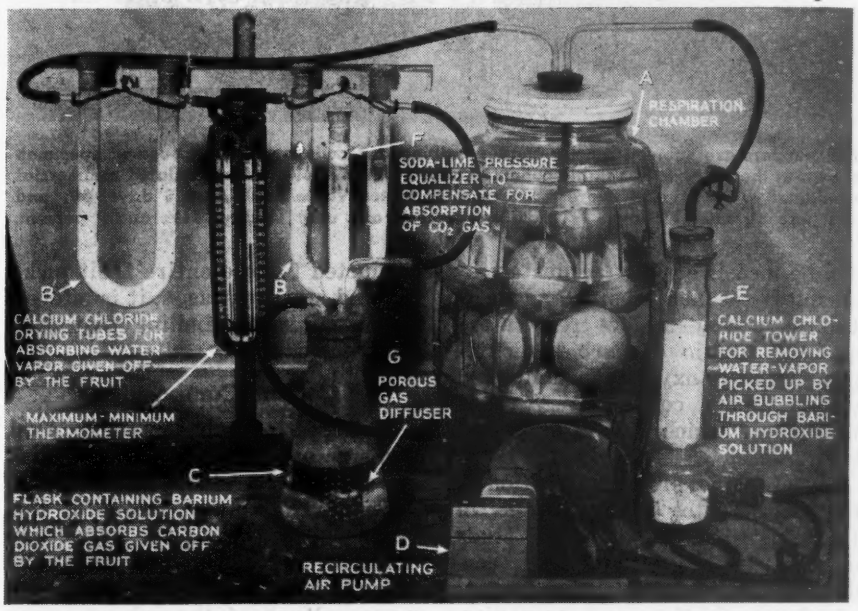
But respiration must not be stopped entirely. Fruit will ferment from complete lack of atmospheric oxygen, producing undesirable alcohols, aldehydes and other toxic products, with early destruction of sugars, acids, vitamins and flavor. The problem of prolonging the life of fruits thus involves restricting the rate of respiration and preventing excessive transpiration in order to maintain the vital food elements in as near the same quantity and quality as in freshly picked fruit.

In the "Flavorseal" process, both the transpiratory and respiratory actions are retarded by a waxy solution on the surface of the fruit, which reduces the breathing area and supplements the natural waxy cuticle to prevent loss of moisture. Other forms of deterioration that are visible to the eye, such as shrivelling, wilting and discoloration, are greatly retarded by this protective treatment.

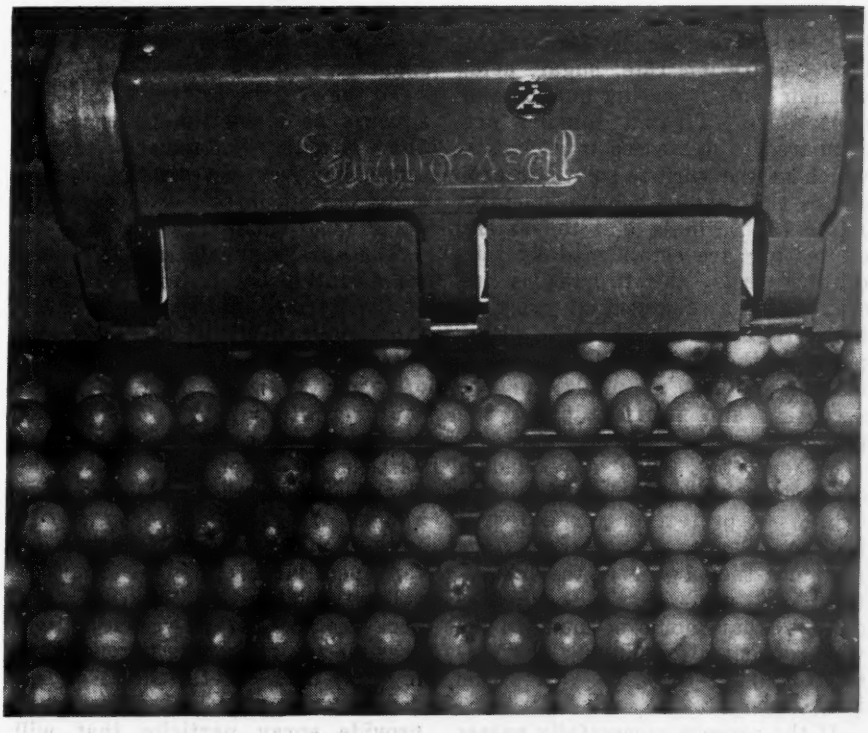
Besides preserving much of the food value of the fruit, the process imparts an attractive luster to the treated products, adding considerably to their appearance and salability.

Wax Adapted to Fruit

Many years of experimentation, in the laboratory and field, were necessary before the correct amount and type of waxy material was found that could be applied to each fruit or vegetable to obtain the optimum results. Fortunately, the amount of oxygen taken in and carbon dioxide given off by fruit


A
RESPIRATION CHAMBER
F
SODA-LIME PRESSURE EQUALIZER TO COMPENSATE FOR ABSORPTION OF CO_2 GAS
B
B
CALCIUM CHLORIDE DRYING TUBES FOR ABSORBING WATER VAPOR GIVEN OFF BY THE FRUIT
MAXIMUM-MINIMUM THERMOMETER
E
CALCIUM CHLORIDE TOWER FOR REMOVING WATER-VAPOR PICKED UP BY AIR BUBBLING THROUGH BARIUM HYDROXIDE SOLUTION
G
POROUS GAS DIFFUSER
C
FLASK CONTAINING BARIUM HYDROXIDE SOLUTION WHICH ABSORBS CARBON DIOXIDE GAS GIVEN OFF BY THE FRUIT
D
RECIRCULATING AIR PUMP

Apparatus for measuring respiration of fruits and vegetables consists of a fruit storage jar and provision to recirculate dry air through calcium chloride tubes to absorb water vapor and through barium chloride tubes to absorb carbon dioxide developed by the fruit.



Oranges on the roller conveyor entering the spraying cabinet.

Bell peppers are subject to color change, wilting and collapse. The wax-coated specimen shown at the left was in salable condition after 30 days. Held under simulated commercial conditions, weight losses were as follows (untreated value first): After 6 days, 3½ and 1½ percent; after 11 days, 7¾ and 5¼ percent; and after 16 days 14½ and 7 percent.

can be measured very accurately by chemical means. Fruits and vegetables having a low respiratory quotient (ratio of carbon dioxide production to oxygen consumption) can be more completely "sealed" than those which have a high quotient.

Before commercial application of the process to any vegetable or fruit, a thorough laboratory study of the particular product is conducted to establish the extent to which respiration and transpiration can be retarded. Samples of the field-fresh product, sprayed with various concentrations of wax solution, are tested during a prolonged storage period for weight loss, respiration rate, sugar, acid, vitamin content, eating quality and appearance. Treated samples are compared to untreated to ascertain which of the various solutions preserves the product most efficiently. After the formula and the extent of coating are established by laboratory tests, the process is installed in a commercial packing house for further pilot trials. Samples of the processed fruit are taken regularly and held for observation and testing during the pilot run.

Some fruits, such as Valencia oranges, require a change in the degree of protection for different periods of the season. From the result of the pilot run, the laboratory can prepare a log of the changes that should be made in the wax concentration during the season's run, for the cases where this is necessary.

If the process successfully passes a semi-commercial test, usually conducted for the entire fruit picking and storage season, it is offered to the industry handling that particular product.

Coating Composition

The treating solution consists of a blend of waxy ingredients dissolved in a petroleum hydrocarbon solvent. The solvent is one of the very volatile cuts of the petroleum distillate and acts merely as a carrying agent for the dissolved waxes. Much of the solvent evaporates before the fine spray particles reach the fruit and the remainder evaporates from the deposited coating in a matter of seconds, while the fruit is still in the chamber.

To the eye, the protective coating appears as a continuous encasing film. Examination under a microscope, however, reveals the film as a discontinuous or porous coating made up of small spray specks.

The spray-particle size is a major factor in determining the kind of film formed and the behavior of the film on the fruit after it leaves the applicator. During the passage of a spray particle from the nozzle to the fruit surface, considerable evaporation occurs, causing the particle to become more concentrated and smaller in size. The amount of evaporation from a particle of a given composition is determined largely by the surface-volume relationship, the air temperature and the air velocity. It is possible to obtain this porous coating only by a careful choice of solvent, wax, nozzle and pressure to provide spray particles that will adhere to the fruit skin as individual specks and not run together to form a complete seal. By varying the porosity of the film, the respiration and transpiration rate of the fruit can be controlled to give the optimum results.

The protective coating is approximately 0.00015 of an inch in thickness. The only visible indication of the film's presence is that treated fruits, such as oranges, have a much higher luster than the untreated. With some products, the improvement in appearance alone is sufficient reason for the treatment. The process does not add any flavor or quality that the product does not naturally possess.

An idea of the amount of wax applied to each fruit can be gained from the fact that 3 lb. of wax in solution will treat about 80,000 average-size oranges.

Automatic Application

The wax spraying machine has a chamber, open at each end. A roller conveyor carries the product through the chamber, the rollers continually turning the fruit. Spray nozzles, mounted above the roller bed, operate through hydraulic pressure of from 20 to 50 p.s.i. supplied by a gear pump.

The wax solution comes from the nozzles in a highly atomized form, spraying downward and forward so as to contact all surfaces of the product as it spins over the roller conveyor. The form of the spray discharge is modified by supplemental air blasts to give greater speed and reach to the highly atomized spray particles. Above and below each spray nozzle are rectangular air-blast apertures of approximately 3 sq. in. each. These are so arranged, with respect to the spray nozzle, that the air streams converge at a point several inches ahead of the nozzle orifice and in the spray stream. The effect of the air blast is to change the spray from its initial cone shape to a flat sheet and to deliver the atomized coating-material particles at a high impact velocity onto the surface of the product. Air is supplied by means of a centrifugal blower at a rate of 90 cu. ft. per minute.

Mounted near the discharge end and under the conveyor rolls, an exhaust blower of 2,500 cu. ft. per minute capacity removes all spent spray particles and solvent vapor from the chamber and discharges them through a conduit to the outside air. The greater capacity of this exhaust blower, as compared

with the air input, causes a certain amount of outside air to be drawn in past the coated fruit, assisting in drying the applied film.

A 4-ft.-wide applicator of this type has a capacity of about 12 field boxes of oranges a minute. However, the unit is easily adapted to handling either 4 or 18 field boxes a minute. By controlling the speed of the roller conveyor, the size of the nozzles and the hydraulic pressure, the unit can be operated at its maximum efficiency to produce exactly the right amount of protection for the particular product. The efficacy of this process is attributed largely to this flexibility. On the average, fruit requires about ten seconds to pass through the applicator, during which time it takes on a lustrous coating and is dry enough for immediate packing.

Laboratory Control

In order that the process can be utilized to its greatest advantage, it is leased to the various packing houses. Supervision and control over its performance is provided by field service men and the laboratory. Samples of fruit are periodically brought into the laboratory for checking, because, only through such laboratory checking, can close control be maintained on the commercial application. A representative sample is taken ahead of the applicator and another immediately after the fruit comes out of the apparatus. Field men check a unit at least once a day and report on such pertinent (but continually varying) factors as the tonnage of the product being treated, field conditions and weather conditions. The laboratory then notifies them if any change in waxing procedure is necessary.

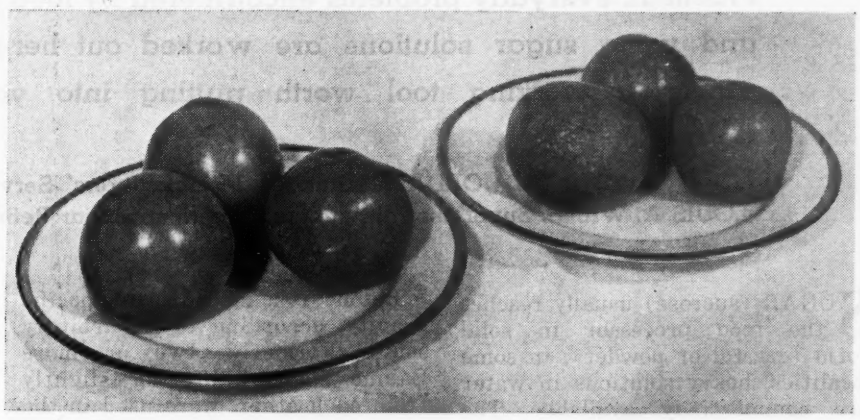
Decay Reduced

In many instances, the treatment has reduced decay. Excessive water loss reduces the vitality of the fruit, making invasion by decay organisms easier. Also, the minute creases formed by the fruit skin as a result of shriveling are ideal places for incubation of mold spores. By reducing the water loss and placing a barrier between the fruit and the organisms in the air, the protective treatment holds much promise in reducing decay of fruits and vegetables.

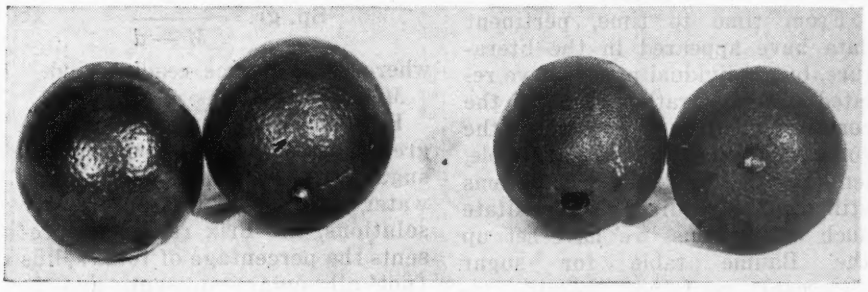
Process Widely Used

The wax process is used on approximately 25 per cent of the nation's citrus fruits and about 80 per cent of all tomatoes grown in Texas and Florida. A large portion of the cantaloupes shipped from California, Arizona, Colorado and Utah are receiving this treatment. Cucumbers and Bell peppers, which are shipped long distances to market, are also protected by the process.

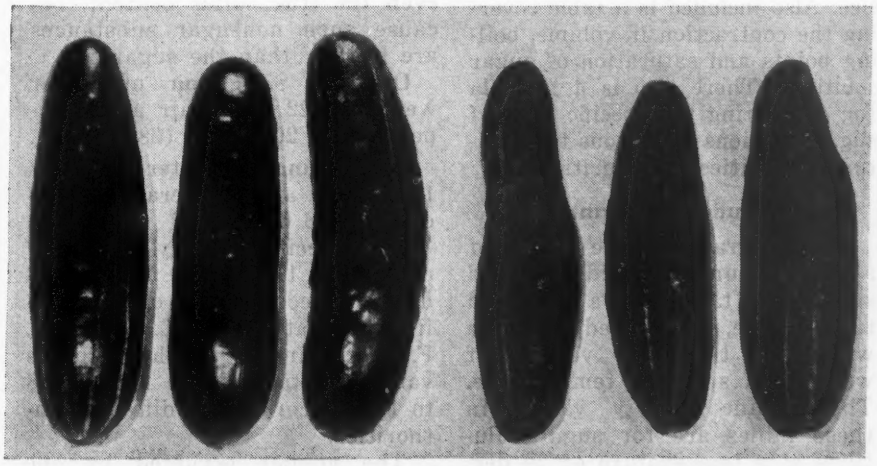
Although the development has progressed to a high stage, further research is being carried out to perfect the process for use on fruits and vegetables other than those now successfully treated.



The reason for the large proportion of the tomato crop which is wax-protected is evident in this picture of fruit that is 3 weeks old. Treated tomatoes (left) not only show less water loss, but had better ascorbic acid retention. Laboratory test figures on shrinkage after 3, 6 and 10 days were, respectively: 1.8 (untreated) and 0.9 percent (treated); 3.2 and 1.65 percent; 5.3 and 2.75 percent. A further test showed 98 and 99 percent of the untreated and treated tomatoes, respectively, in marketable condition after 6 days at normal room conditions; 81 and 95 percent after 10 days; with only 60 percent of the untreated fruit marketable after 13 days, as against 90 percent of that treated.



Oranges after 23 days at normal room conditions (70 deg. F. and 68 percent relative humidity). Those at the left were wax protected, those at the right were untreated. Loss after the first week was 4 percent for the untreated, 2¼ percent for the treated; after 3 weeks this became 10½ percent for the untreated, 6 percent for the treated.



The cucumbers on the right show shriveling and wilting of the stem end in 24 days of normal room conditions. Those that were spray-coated, shown at the left, are firm and unblemished. Weight losses were 11½ percent for the untreated and 6¼ percent for the treated after 6 days; 15 percent for the untreated and 8 percent for the treated after 12 days; and 22¼ percent for the untreated and 11¾ percent for the treated after 18 days.

How to Solve Problems IN SIRUP MAKING AND USE

Practical, everyday problems encountered by food plant men in making and using sugar solutions are worked out here. Which makes this article a working tool worth putting into your plant notebook

By STROUD JORDAN, Manager, Manufacturers' Service Division, and
LOUIS A. WILLS, Supervisor of Refining, American Sugar Refining Co., New York, N. Y.

SUGAR (sucrose) usually reaches the food processor in solid form (crystal or powder). In some localities, heavy solutions in water are commercially available. The several sirup types vary, and users must be familiar with the characteristics and percentage composition of each. This obviously is necessary, since water is either added or removed during most manufacturing processes that require the use of sugar.

From time to time, pertinent data have appeared in the literature, but individual papers have related to parts rather than to the complete picture. Even when the complete picture is available, lengthy and tedious calculations still may be required. To facilitate such calculations, we have set up the Baumé table for sugar (sucrose) contained herein, together with some discussion of solution constants, and have included some problems which illustrate the use of the table in practice. Also included is a table covering the contraction in volume, boiling points and saturation of sugar solutions. There also is a formula for calculating the specific heat of sugar solutions at various temperatures, densities and purities.

Solution Constants

Specific gravity is the weight of a given volume of solid or liquid substance, taken at a specified temperature, compared to the weight of the same volume of water at a specified temperature. The specific gravity values in these tables are for sugar solutions at a temperature of 20 deg. C., compared to water at the same temperature. Another widely used table compares a substance at 20 deg. C. to water at 4 deg. C.

Baumé is a measure of specific gravity, according to an arbitary scale. Formerly, two or more Baumé scales, differing slightly from each other, were used in the sugar industry. In 1918, the U. S. Bureau of Standards proposed a scale for sugar, based on the modulus 145, as it is called, and this scale has been generally adopted. Its relation to specific gravity is shown by the formula,

$$\text{Sp. gr.} = \frac{M}{M - d}$$

where d = Baumé reading and $M = 145$.

Brix is a scale wherein one degree represents one percent of sugar by weight in a pure sugar-water solution. In less pure sugar solutions, the Brix reading represents the percentage of total solids (not all sugar) present, and in solutions containing a large percentage of nonsugar substances, such as refiners' sirup, the Brix reading is appreciably higher than even the true solids content, because such nonsugar substances are heavier than the sugar.

One U. S. gallon of water weighs 8.322 lb. in air at a temperature of 20 deg. C. (68 deg. F.).

One pound of water contains 15.38 fl. oz. at a temperature of 20 deg. C. (68 deg. F.).

The specific gravity of sugar crystals is 1.588 at 20 deg. C. (68 deg. F.) according to one authority; 1.588 at 18 deg. C. (64.4 deg. F.) according to another; and is variously stated to be from 1.588 to 1.61, according to different authorities.

The volume occupied by one pound of sugar at 20 deg. C. (68 deg. F.) if it were a continuous solid mass, free from voids, would be 10.075 fl. oz., assuming its specific gravity to be 1.588 at 20 deg. C. (68 deg. F.). A pound of sugar in solution occupies slightly less than 10.075 fl. oz., because of the contraction that takes place upon dissolving. This contraction varies from 1.2 percent in a 45-deg. Brix to 1.37 percent in a 60-deg. Brix solution and back to 1.15 percent in an 80-deg. Brix solution.

Brix values are determined by using the standard Brix hydrometer at 20 deg. C. (68 deg. F.), a refractometer at 20 deg. C. (68 deg. F.), or by determining specific gravity by any one of a number of methods and converting to sugar percentage.

Baumé values are usually determined directly by means of the standard Baumé hydrometer or by converting a Brix reading to Baumé, for which Table I* will serve.

Problems

Problem 1—To make a sugar sirup of any given Baumé, determine the pounds of sugar and the pounds of water in a finished gallon of such sirup by reference to the Baumé table. Dissolve the sugar in the water.

Example—It is desired to make 100 gal. of a 32-deg. Baumé sirup. By referring to the table, we find that 1 gal. of a 32-deg. Baumé sirup contains 6.31 lb. of sugar and 4.37 lb. of water. Therefore, 100 gal. will contain 631

*The Baumé table is based upon values contained in U. S. Bureau of Standards Circular No. 375, entitled, "Weights Per United States Gallon and Weights Per Cubic Foot of Sugar Solutions," issued October 2, 1929. Baumé, Brix and Weight Per Gallon values were interpolated directly from Table 1 of the Circular. From these values, Pounds Sugar per Gallon, Pounds Water per Gallon, Avoirdupois Ounces Sugar per Gallon and Fluid Ounces Water per Gallon were calculated. It will be noted that the values in the table are for the temperature of 20 deg. C. (68 deg. F.). They would require adjustment if the materials are hot.

lb. of sugar and 437 lb. of water (437 lb. of water, under standard conditions, is equal to 52.5 gal.).

When heat is used to dissolve the sugar in the water, evaporation will take place. To correct for this loss, add sufficient water to produce 100 gal. of finished sirup at 68 deg. F.

Problem 2—To dilute 1 gal. of sirup of given Baumé to a lower Baumé, multiply the pounds of water per gallon of the diluted sirup by the pounds sugar per gallon of the original sirup and divide by the pounds of sugar per gallon of the diluted sirup. From the result, subtract the pounds of water in the original sirup to obtain the pounds of water which must be added.

When dealing with a larger quantity of sirup, multiply the pounds of water required to dilute 1 gal. by the number of gallons to be diluted and add that quantity of water.

Example—It is required to dilute 42 gal. of 35-deg. Baumé sirup to 31 deg. Baumé.

From the table, 35-deg. Baumé sirup contains 7.12 lb. of sugar and 3.85 lb. of water per gallon; 31-deg. Baumé sirup contains 6.05 lb. of sugar and 4.54 lb. of water per gallon.

Quantity of water in diluted sirup

$$= \frac{4.54 \times 7.12}{6.05} = 5.34 \text{ lb.}$$

For 1 gal.: Quantity of water to be added to 35-deg. Baumé sirup = 5.34 − 3.85 = 1.49 lb.

For 42 gal.: Quantity of water required = 1.49×42 = 62.58 lb. = 7 gal. 67 fl. oz.

The diluted sirup will amount to 49 gal. 67 fl. oz. (42 gal. + 7 gal. 67 fl. oz.)

Problem 3—To thicken one gallon of sirup of given Baumé to a higher Baumé, multiply the pounds of sugar per gallon of the thickened sirup by the pounds of water per gallon of the original sirup and divide by the pounds of water per gallon of the thickened sirup. From the result, subtract the pounds of sugar per gallon of the original sirup to obtain the pounds of sugar to be added.

When dealing with a larger quantity of sirup, multiply the pounds of sugar to be added to one gallon by the number of gallons of sirup that is to be thickened and add that quantity of sugar.

Example—It is required to thicken 42 gal. of 31-deg. Baumé sirup to 35-deg. Baumé.

From the table: 31-deg. Baumé sirup contains 6.05 lb. of sugar and 4.54 lb. of water per gal. 35-deg. Baumé sirup contains 7.12 lb. of sugar and 3.85 lb. of water per gal.

TABLE I—Table for Use With Baumé Hydrometers.

Degrees Baumé M-145 20°C.	Degrees Brix 20°C.	Weight per gal. in air 20°C.	Pounds sugar per gal.	Pounds water per gal.	Avoirdupois oz. sugar per gal.	Fluid ounces water per gal.
0.5	0.9	8.35	0.07	8.28	1.2	127.3
1.0	1.8	8.38	0.15	8.23	2.4	126.6
1.5	2.7	8.41	0.23	8.18	3.6	125.8
2.0	3.6	8.44	0.30	8.14	4.8	125.2
2.5	4.5	8.47	0.38	8.09	6.1	124.4
3.0	5.4	8.50	0.46	8.04	7.3	123.7
3.5	6.3	8.53	0.54	7.99	8.6	122.9
4.0	7.2	8.56	0.61	7.95	9.8	122.3
4.5	8.1	8.59	0.69	7.90	11.1	121.5
5.0	9.0	8.62	0.77	7.85	12.4	120.7
5.5	9.9	8.65	0.85	7.80	13.7	120.0
6.0	10.8	8.68	0.94	7.74	15.0	119.0
6.5	11.7	8.71	1.02	7.69	16.3	118.3
7.0	12.6	8.75	1.10	7.65	17.6	117.7
7.5	13.5	8.78	1.19	7.59	19.0	116.7
8.0	14.4	8.81	1.27	7.54	20.3	116.0
8.5	15.3	8.84	1.35	7.49	21.7	115.2
9.0	16.2	8.87	1.44	7.43	23.0	114.3
9.5	17.1	8.90	1.52	7.38	24.4	113.5
10.0	18.0	8.94	1.61	7.33	25.7	112.7
10.5	18.9	8.97	1.70	7.27	27.1	111.8
11.0	19.8	9.00	1.78	7.22	28.5	111.0
11.5	20.7	9.04	1.87	7.17	29.9	110.3
12.0	21.6	9.07	1.96	7.11	31.3	109.4
12.5	22.5	9.11	2.05	7.06	32.8	108.6
13.0	23.4	9.14	2.14	7.00	34.2	107.7
13.5	24.3	9.17	2.23	6.94	35.7	106.7
14.0	25.3	9.21	2.33	6.88	37.3	105.8
14.5	26.2	9.24	2.42	6.82	38.7	104.9
15.0	27.1	9.28	2.51	6.77	40.2	104.1
15.5	28.1	9.32	2.61	6.71	41.8	103.2
16.0	29.0	9.36	2.71	6.65	43.4	102.3
16.5	29.9	9.40	2.81	6.59	45.0	101.4
17.0	30.8	9.43	2.90	6.53	46.4	100.4
17.5	31.7	9.47	3.00	6.47	48.0	99.5
18.0	32.6	9.50	3.10	6.40	49.6	98.4
18.5	33.6	9.54	3.20	6.34	51.2	97.5
19.0	34.5	9.58	3.31	6.27	53.0	96.4
19.5	35.4	9.62	3.41	6.21	54.6	95.5
20.0	36.3	9.66	3.51	6.15	56.2	94.6
20.5	37.3	9.70	3.62	6.08	57.9	93.5
21.0	38.2	9.73	3.72	6.01	59.5	92.4
21.5	39.1	9.77	3.82	5.95	61.1	91.5
22.0	40.1	9.81	3.93	5.88	62.9	90.6
22.5	41.0	9.85	4.03	5.82	64.5	89.5
23.0	41.9	9.89	4.15	5.74	66.4	88.3
23.5	42.9	9.93	4.26	5.67	68.2	87.2
24.0	43.8	9.97	4.37	5.60	69.9	86.1
24.5	44.7	10.01	4.47	5.54	71.5	85.2
25.0	45.7	10.06	4.60	5.46	73.6	84.0
25.5	46.6	10.10	4.71	5.39	75.4	82.9
26.0	47.6	10.14	4.83	5.31	77.3	81.7
26.5	48.5	10.18	4.94	5.24	79.0	80.6
27.0	49.5	10.23	5.06	5.17	81.0	79.5
27.5	50.4	10.27	5.18	5.09	82.9	78.4
28.0	51.4	10.32	5.30	5.02	84.8	77.2
28.5	52.3	10.36	5.42	4.94	86.7	76.0
29.0	53.3	10.41	5.55	4.86	88.8	74.8
29.5	54.2	10.45	5.66	4.79	90.6	73.7
30.0	55.2	10.50	5.80	4.70	92.8	72.3
30.5	56.2	10.54	5.92	4.62	94.7	71.1
31.0	57.1	10.59	6.05	4.54	96.8	69.8
31.5	58.1	10.64	6.18	4.46	98.9	68.6
32.0	59.1	10.68	6.31	4.37	101.0	67.2
32.5	60.0	10.73	6.44	4.29	103.0	66.0
33.0	61.0	10.78	6.58	4.20	105.3	64.6
33.5	62.0	10.83	6.71	4.12	107.4	63.4
34.0	63.0	10.88	6.85	4.03	109.6	62.0
34.5	63.9	10.92	6.98	3.94	111.7	60.6
35.0	64.9	10.97	7.12	3.85	113.9	59.2
35.5	65.9	11.02	7.26	3.76	116.2	57.8
36.0	66.9	11.07	7.41	3.66	118.6	56.3
36.5	67.9	11.13	7.56	3.57	121.0	54.9
37.0	68.9	11.18	7.70	3.48	123.2	53.5
37.5	69.9	11.23	7.85	3.38	125.6	52.0
38.0	70.9	11.28	8.00	3.28	128.0	50.5
38.5	71.9	11.33	8.15	3.18	130.4	48.9
39.0	72.9	11.39	8.30	3.09	132.8	47.5
39.5	73.9	11.44	8.45	2.99	135.2	46.0
40.0	74.9	11.49	8.61	2.88	137.8	44.3

Quantity of sugar in thickened sirup

$$= \frac{7.12 \times 4.54}{3.85} = 8.40 \text{ lb.}$$

Quantity of sugar to be added to one gallon of original sirup = 8.40 — 6.05 = 2.35 lb.

Quantity of sugar to be added to 42 gal. of original sirup = 2.35 × 42 = 98.70 lb. = 98 lb. 11 oz.

The thickened sirup from one gallon of the original sirup will amount to 8.40 + 4.54 = 12.94 lb. From the table, the weight per gallon of the thickened sirup (35 deg. Baumé) is 10.97 lb., and it therefore amounts in gallons to 12.94 ÷ 10.97 = 1.18 gal. The total batch will amount to 1.18 × 42 = 49.56 gal., or 49 gal. 72 fl. oz.

Problem 4—To make sirup of given Baumé, starting with 100 lb. of granulated sugar, multiply the pounds of water per gallon of the desired sirup by 100 and divide by the pounds of sugar per gallon of same. To find the number of gallons of sirup which are produced, divide the combined weight of the sugar and the water used by the weight per gallon of the sirup.

Example—It is required to make 33-deg. Baumé sirup from 100 lb. of granulated sugar. From the table, 33 deg. Baumé sirup weighs 10.78 lb. per gallon and contains 6.58 lb. of sugar per gallon and 4.20 lb. of water per gallon.

Quantity water required

$$= \frac{4.20 \times 100}{6.58} = 63.8 \text{ lb. (7 gal. 86 fl. oz.)}$$

Gallons of sirup produced

$$= \frac{100 + 63.8}{10.78} = 15.19 \text{ gal. (15 gal. 24 fl. oz.)}$$

Problem 5—To dilute a sirup of given Baumé to make 1 gal. of sirup of a given lower Baumé, multiply the weight per gallon of the original sirup by the pounds of sugar per gallon of the desired diluted sirup, and divide by the pounds of sugar per gallon of the original sirup, to find the weight of the original sirup required. Subtract this from the weight per gallon of diluted sirup to find the weight of water required.

When dealing with a larger quantity than one gallon, multiply the pounds of the original sirup and, in turn, the pounds of water, required for one gallon by the number of gallons of the diluted sirup it is desired to make.

Example—It is required to make 75 gal. of sirup at 28 deg. Baumé by diluting the necessary quantity of 32-deg. Baumé sirup.

From the table, 32-deg. Baumé sirup weighs 10.68 lb. per gallon and contains 6.31 lb. of sugar per gallon. 28-deg. Baumé sirup weighs 10.32 lb. per gallon and contains 5.30 lb. of sugar per gallon. For 1 gal.:

Quantity of sirup

$$= \frac{10.68 \times 5.30}{6.31} = 8.97 \text{ lb.}$$

Quantity of water

$$= 10.32 - 8.97 = 1.35 \text{ lb.}$$

For 75 gal.: Pounds of sirup = 8.97 lb. × 75 = 672.8 lb. Gallons of sirup = 672.8 ÷ 10.68 = 63 gal. Quantity of water = 1.35 lb. × 75 = 101.3 lb., or 12 gal. 22 fl. oz.

Problem 6—To thicken a sirup of given Baumé to make one gallon of sirup of a higher given Baumé, multiply the weight per gallon of the original sirup by the pounds of water per gallon of the desired thickened sirup and divide by the pounds of water per gallon of the original sirup to find the pounds of the original sirup required. Subtract this from the weight per gallon of the desired thickened sirup, which gives the weight of additional granulated sugar required. When dealing with a larger quantity than one gallon, multiply the pounds of original sirup and, in turn, the pounds of sugar, required for one gallon by the number of gallons of the thickened sirup it is desired to make.

Example—It is required to make 50 gal. of 36-deg. Baumé sirup by adding the necessary quantity of sugar to the necessary quantity of 30-deg. Baumé sirup.

From the table: 30-deg. Baumé sirup weighs 10.50 lb. per gallon and contains 4.70 lb. of water per gallon. 36-deg. Baumé sirup weighs 11.07 lb. per gallon and contains 3.66 lb. of water per gallon. For 1 gal.:

Quantity of sirup

$$= \frac{10.50 \times 3.66}{4.70} = 8.18 \text{ lb.}$$

Quantity of sugar = 11.07 — 8.18 = 2.89 lb.

For 50 gal.: Pounds of sirup = 8.18 lb. × 50 = 409.0 lb. Gallons of sirup = 409.0 ÷ 10.50 = 38.95 gal. = 38 gal. 122 fl. oz. Quantity of sugar = 2.89 lb. × 50 = 144.5 lb.

TABLE II — Contraction in Volume, Boiling Points, Solubility.

Contraction in volume (15° /15°C.)[1] (c.c. per liter)		Boiling points[2]		Solubility[3]	
Sugar %	c.c.	Sugar %	Temp. F°	Sugar %	Temp. C°
0	0			64.18	0
5	1.5			64.87	5
10	3.0	10	212.7	65.58	10
15	4.5			66.30	15
20	6.0	20	213.1	67.09	20
25	7.4			67.89	25
30	8.7	30	213.8	68.70	30
35	9.9			69.55	35
40	11.0	40	214.7	70.42	40
45	12.0			71.32	45
50	12.8	50	215.6	72.25	50
55	13.4			73.20	55
60	13.7	60	217.4	74.18	60
65	13.7			75.18	65
70	13.4	70	223.7	76.22	70
75	12.6			77.27	75
80	11.5	80	233.6	78.36	80
85	9.8			79.46	85
90	7.5	90.8	266.0	80.61	90
95				81.77	95
100				82.97	100

[1] Derived from Plato's calculated values.

[2] Normal (sea level) pressure according to Gerlach.

[3] According to Herzfeld.

Other Determinations

To enable those who will have occasion to ascertain volume contraction, boiling points, saturation values and specific heat, Table II and the following formula will be of value. To assist those who require more detailed data, references have been appended.

Formula for Specific Heat of Sugar Solutions*

$$S = 1 - 0.632 - 0.001\,t + \frac{B}{0.0011(100 - P)\frac{}{100}}$$

where S = specific heat of the solution
t = temperature, degrees Fahrenheit
P = purity of the solution
B = percent of solids in the solution

*Adapted from the formula of Janovsky and Archangelsky by E. J. Culp (American Sugar Refining Co.).

(*Turn to page* 166)

EDITORIALS

LAURENCE V. BURTON, Editor

The Secretary of Commerce

HENRY A. WALLACE has been confirmed to the post of Secretary of Commerce—a job that can be of great help to the business of the United States if he has the will and the ability. While he is not a man that business endorses, he is a capable administrator.

If Congress reasserts its rights, assumes its responsibility of determining what the laws of the land shall be, refuses to enact bills written in the White House and writes its own, then Mr. Wallace's new job should not be the cause of added business worries. But if Congress is timorous, evades its responsibility, and permits a continuation of the trend toward a government by men rather than by laws, then Mr. Wallace's poorly understood theories may well become a source of disturbing apprehension. He will, however, administer capably the laws laid down by Congress.

In any event, it should be apparent to everyone with half an eye that Mr. Wallace would still be a factor in Washington even if the Senate had refused to confirm him. In the Commerce post he may prove to be surprisingly helpful if he takes his responsibilities seriously. If, on the other hand, he really intends to try to change the whole character of the country, he may be less harmful than he might be in some other post.

Business needs a champion in Washington. We hope Mr. Wallace will do his duty well.

George W. Cobb

THE existence of the splendid research laboratories of the National Canners Association in Washington, San Francisco and Seattle is due in part to the vision and foresight of George W. Cobb, who recently died in Florida. How much credit should go to him and how much to the late H. W. Phelps for taking the initial steps that made the laboratories possible will probably never be known. Both these former officials of American Can Company early realized the need for the growing canning industry to begin scientific studies of its own problems. Shortly after the first Food and Drug Law was enacted, their judgment, supported by generous donations from the American and Continental can companies, made possible the laboratories that now work on all manner of problems for the entire canning industry. The research results from these laboratories is of such excellence and value that all of the can companies are contributing today to their support.

Young men in the industry today should be reminded of the vision and wisdom that reposed in men like Mr. Cobb, which finds fruition today in what is now known as food technology.

The Law Against Discrimination

THE first state law prohibiting discrimination against race, color, creed or nation of origin as a basis for employment, dismissal or membership in a labor organization became effective on March 12 in New York. Its objective is undeniably good, but *homo sapiens*, being the sort of a guy he is, will not—cannot—be legislated into an attitude. It was not possible to legislate an attitude on the liquor question. It will not be possible to legislate an attitude toward people, even under the threat of a $500 fine.

It should not surprise us to learn later on that candidates for jobs will soon be required to take examinations in Arabic, Tonkinese, Sanskrit, Determinants, Celestial Mechanics and Abelian Integrals.

One newspaper comment says that education will be required to correct the prejudices that now exist, implying that employers need the education. This, we believe, is only a partial truth. Those who would be employees also need education. Good manners and good deportment would do more good than 48 such laws.

How To Attract Higher Class Help

WORKING conditions in some food plants leave much to be desired. Poor working conditions repel high-grade help — high-grade people need not put up with discomfort, certainly not in 1945.

To be specific, the daughter of a friend felt the call of duty last year, got a job in a food plant, but worked only two days. Her reason for quitting was that she had to stand in water over her shoe tops. Nothing was done about it.

Whether or not there were mitigating circumstances we do not know. But we are certain that a plant which permits such unattractive working conditions will get only the help that nobody else wants.

Smart management will utilize every device and opportunity to make its plant a place of which an employee may be proud, and where work is not sheer drudgery and endurance.

Lest We Forget

RECENTLY an old letter, August 27, 1930, turned up. Written to the Boss in a whimsical moment, it proposed a special theme number of FOOD INDUSTRIES to be called a "Mean-ness Issue." You probably don't recall the grief of 1930. Maybe the proposed contents will convince you that your troubles today are not so bad after all.

Here was the plan of that issue:

"Fighting the Racketeers," by a New York dairyman.

"Selling Off-grade Glucose to Bootleggers," by a manufacturer of derivatives of corn.

"Why I Always Have to Sell Two Cars of Pickles Whenever I Deliver One," by a small pickle manufacturer.

"Furnishing the Retailer With Everything Except Cash," by a Struggling Ice Cream Manufacturer.

Symposium: "Why My Competitor Ought to be in Jail."

"Special effort should be made to interest advertisers of gallows, jails, poison gas, insect powder, brass knuckles, shot guns, grenades, bombs, armored motor cars, tombstones and burglar alarms."

Preventable Cleaning Is Wasteful

WHEN seeking angles of attack on the perennial problems of reducing costs, the prevention of the need for cleaning costs is a likely one. One does not advocate or condone a dirty plant or dirty equipment when avoiding needless cleaning expense, for food plants must always be spotlessly clean.

A clean and tidy plant seldom becomes dirty or disorderly by a spontaneous process. People usually are the offenders. Man, as we have often observed, is not uniformly a clean animal. Yet encouraged, stimulated, rewarded or disciplined, he will improve. All depends on the topside attitude. If management insists on a clean plant, it will be clean.

But there is another sort of cleaning that is less easy to do, and costs more. This job is the cleaning of equipment, the shutting down of which requires all else to shut down. It does not involve the removal of dirt so much as the removal of precipitates, foreign material or scale-forming materials.

Filters, strainers and filter presses are forms of apparatus that gradually fill up with the material they are designed to remove. Any pretreatment that reduces their load and keeps them in operation for an increased period is likely to prove profitable. Evaporators often become so scaled that they must be shut down and thoroughly cleaned—a job often taking a full day, or perhaps longer. Pretreatment may perhaps remove the scale-producing material or render it less objectionable, thus permitting the equipment to operate on longer runs before the periodic shutdowns for clean outs.

Sometimes, however, the material of construction can be a factor in ordinary sanitary cleanliness, such as the use of polished stainless steel in place of rougher painted surfaces.

And still another little explored aspect of "cleanliness" is the use of polished stainless steel on conveyors for glass containers. (We think it would apply to all sorts of containers as well.) Some firms are learning that the clean, *i. e.*, smooth, surface of polished stainless permits glass containers to slide along easily in close-order formation. This avoids temporary gaps and the subsequent shocks when the jars close up. Although modern glass seldom breaks as it once did, any breakage is waste and the clean-up that must inevitably follow is still more waste if it can be prevented.

Then, too, there is the matter of an adequate amount of equipment to permit proper cleaning when the job still is easy to perform. In the case of fluid milk, this has been found to be particularly true. Heaters and coolers accumulate milkstone in a 16-hour run to such an extent that satisfactory cleaning is an exceedingly laborious task, whereas the job of cleaning them after an 8-hour run is comparatively simple. Those who have studied the matter state that cleaning up after one 16-hour run is much more expensive of labor and materials than cleaning after two 8-hour runs. The decision to have double sets of equipment is, however, a management—not a supervisory—function, but it is well for all to know the possibilities.

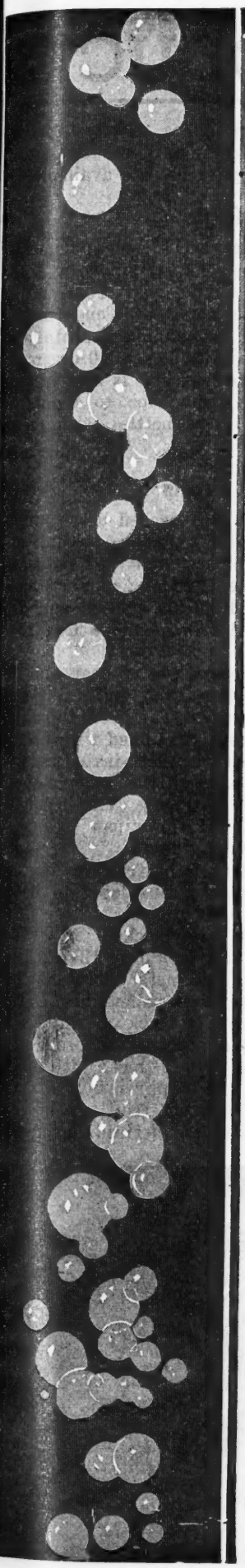
For postwar planning, the avoidance of preventable cleaning expense is a place where even a foreman can profitably study and plan for more economic operations. But, remember, the idea is to reduce cleaning costs, not to reduce cleanliness.

Humble Fundamentals Still Needed

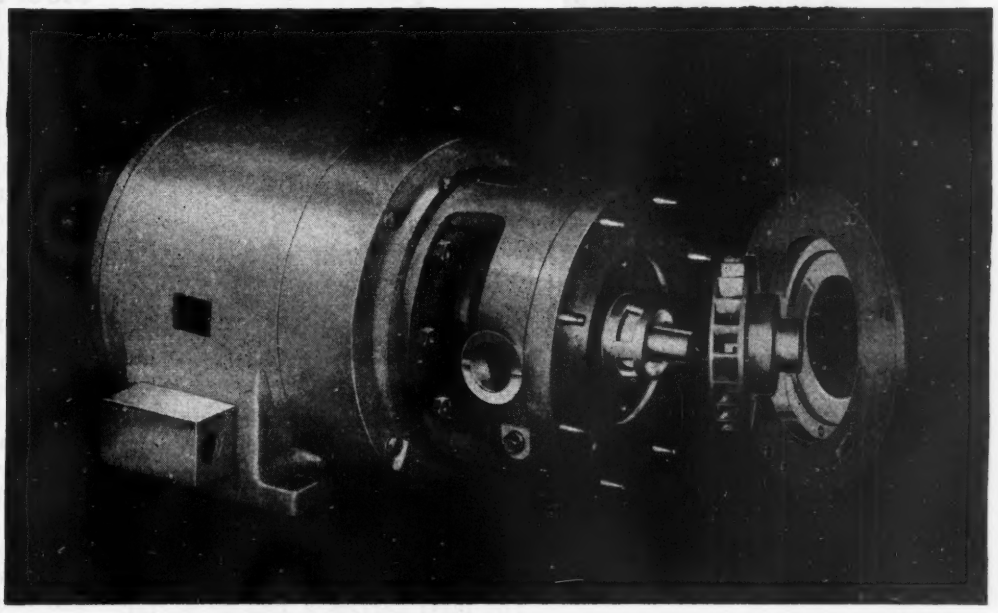
THERE is a lesson for all in the following tale about one food technologist whose employer was dissatisfied with his performance as production manager. He took his responsibilities altogether too lightly, delegated work to others without following up to see that it was properly carried out, permitted considerable numbers of workers to work overtime without any supervision, apparently never tumbled to the fact that the big boss had the habit of poking around the factory at odd hours, especially on Saturday afternoons and Sundays, to see what was doing and what was being neglected, never mastered the technics of production of every food item in the rather large line, came to work after the plant started in the morning and always went home at the normal quitting time even when the whole place was working overtime, and resented suggestions from topside that something different was expected of him.

Admittedly this is only the employer's angle, but if it is what was wanted, the production manager should have delivered the sort of service requested. While the employer asserts that this was a failure of food technology, the plain fact is that it was a man failure. There are few food companies where a production manager can justifiably regard himself as a big shot whether he is a food technologist or not.

Young men are apt to regard the top jobs as easy money when looking up at them. They seldom realize that the higher salaries of the bigger jobs are given to compensate for the bigger headaches these jobs entail. And if a man has not learned what is vaguely termed "how to work" in the humble tasks around a factory, the likelihood of his making good as head of the factory is rather small, especially if the owners know and operate the business.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

THE NASH ENGINEERING COMPANY

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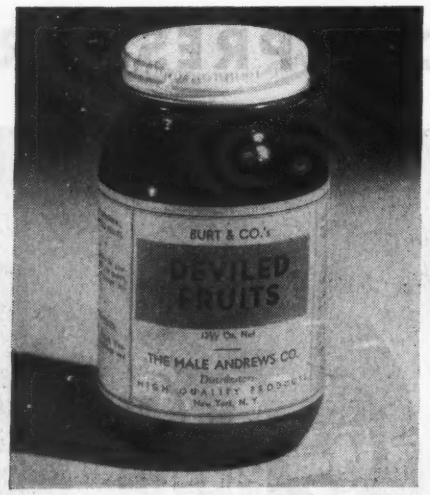
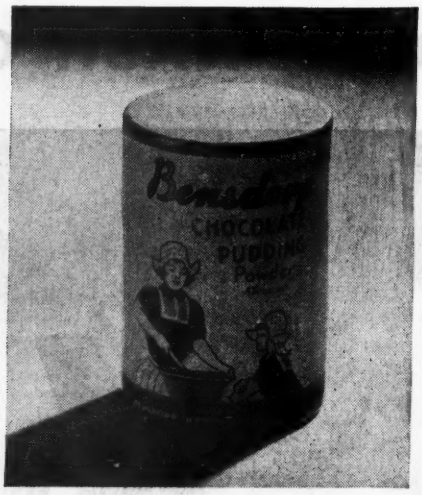




Hot and Spicy

SPICY FRUIT relishes are increasing in popularity. Burt and Co.'s Deviled Fruits has been distributed by The Hale Andrews Co., New York, for some time in a restricted territory including upstate New York and Connecticut, but it is new on other markets.

This mixture contains whole bleached raisins, citron peel, orange peel, lemon slices and other fruits, in a very hot spiced vinegar sauce. No artificial coloring, flavoring or preservative is required.

The label is printed in black and orange against a buff background. The screw-cap jar holds 13½ oz., net.

From Hawaii

EMPHASIS on flavor and aroma finds one expression in spiced or flavored vinegars such as one now made in California from ripe pineapple juice fermented and distilled in Hawaii. With water added to a final 4½ percent acetic acid strength, it is aged in wood.

The Barra Co., Los Angeles, Calif., distributes Barra's Hawaiian Pineapple Vinegar through specialty food stores, in standard pint clear glass bottles with plastic screw caps.

Flavors Marshmallow

MARSHMALLOW in orange and mint flavors is packed by California Fruit Chimes Co., San Gabriel, Calif., which recommends Mission Chimes Marshmallow Whip Topping for use on cakes, pies, cookies and puddings, as well as on fresh fruits and ice cream.

The ingredient list mentions corn sirup, egg albumen, sugar, salt, flavors and 0.1 percent of benzoate of soda.

The topping is packed in half-pint, pint and quart standard glass jars with blackplate screw tops. The label carries a picture of the San Gabriel Mission, in orange and black, with the lettering all in black on a white background.

Pudding Powder

A SPIRALLY wound cylindrical paper container holding 4½ oz. is used by Bensdorp Importers, Inc., Boston, Mass., for its chocolate pudding powder. The label, which seals on the cap, is yellow, printed in red and blue. The chipboard slipover ends are bright red. The design includes figures of a Dutch mother and daughter.

The pudding powder contains chocolate, cornstarch, sugar, salt and vanillin artificial flavor.

Distribution has been restricted to Boston and a few test-market outlets in the larger cities, until more supplies become available.

Meat Magic

PAPAIN extract for meat tenderizing is being distributed by Vital Products Corp., New York, under the trade name of Tendermagic. The clear amber liquid, containing the active enzyme and 0.1 percent of sodium benzoate, is sold in several sizes from 4 oz. to 1 gal., in standard glass bottles with metal screw caps.

Dessert Fruits

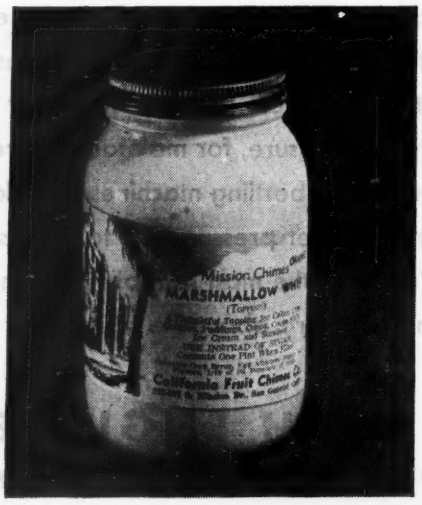
PREPARED and packed under ultraviolet light to assure cleanliness and keeping quality, Fortissimo Marzipaned Prunes and Fortissimo Gingery Figs are packed and distributed by Isrin-Oliver Co., New York.

The process uses no heat, and the fruits retain their natural flavor and sweetness. The prunes are pitted by hand, then filled with marzipan mixed with dehydrated banana powder and ground orange peel, blended with honey. The figs have a filling of marzipan seasoned lightly with ginger.

Selection of the fruit for texture and aroma is considered to be of primary importance.

Fruits are packed in wide-mouth jars holding 12 oz. net weight. The metal screw cap has a heavily waxed paper liner. Labels are printed in black on white.

It is planned that as production increases, prunes that a bit too dry to meet the requirements for the stuffed dessert fruit pack, but which have the desired flavor and



aroma, will be made into superior flavored prune butter, either with lemon or with ginger added, also prepared without heating.

Whip It

DESSERTS that lack interest when they lack whipped cream can now be rescued with a vegetable product distributed by Devonshire Topping, Inc., New York.

An emulsion, cream-like in consistency and color, is made with soybean protein, soybean and cottonseed oils, and corn sirup, artificially colored and flavored. Inorganic constituents are listed as calcium, potassium, sodium, magnesium, iron, phosphorus, chlorine and sulphur. The topping will keep several days under refrigeration. It must be whipped before use and is not suitable for use in place of the plain heavy cream.

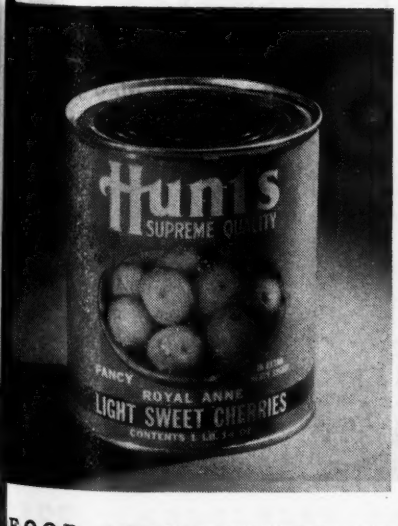
A heavily waxed conical half-pint container carries label information in blue on the closing disk.

Devonshire Topping was put on sale the middle of March in delicatessens in New York City, and somewhat earlier in Detroit and other test markets.

Snappy Labels

LABEL changes characterized by easier reading and greater color intensity have been made by Hunt Brothers Packing Co., San Francisco, Calif., for its line of processed food products. Natural-color photographs are included in the design. White or lemon yellow lettering is used, against a background of deep red, with an oval trademark panel and band of chrome green.

The company plans to continue the policy, begun in 1943, of distributing its products under its own brand instead of under private labels.



Butter Flavor

FOR cakes, cookies, confectionery, icings, desserts, puddings and other sweet products, butter flavor is combined with vanilla flavor in a blend manufactured and sold by Whitehall Food Manufacturing Corp.

Maison Royal Butta-Van contains vanillin, coumarin, diacetyl, butyric and other organic acids, ethyl butyrate and other esters, propylene glycol, glycerine, water and caramel color. It is formulated to use in place of plain vanilla flavor wherever bland shortenings have replaced butter, with loss of flavor.

The flavoring is packed in barrels, in gallon jugs and in standard amber glass bottles ranging from 4-oz. to 1-qt. capacity.

For Efficiency

AUTOMATIC filling of each of the three component packages has been adopted by Kurtz Bros., Bridgeport, Pa., for Magic Chef Spaghetti Dinner.

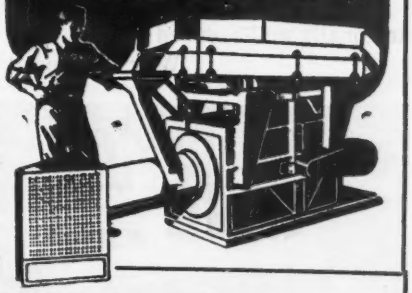
The principal change is in the handling of the spaghetti, which is now packed in a lightweight folding carton having an allover design in yellow and brown, suggesting the spaghetti, with a deep blue band around the carton bearing the identifying information.

The outer carton still carries a picture of the chef, but both this picture and the lettering have been completely restyled so as to give greater clarity to the labeling and an appearance of greater size. A transparent window shows a section of the tall square crown-capped sauce bottle and the spaghetti carton. Grated cheese is in a waxed glassine envelope.

Take the $ $ $ $ $ $ $ out of $tone$

• Now, with critical war shortage of labor, streamline STONING in your mill. Removing stones has always been slow, laborious and costly out of proportion to other steps in processing cereals, soy beans, and other dry foods. To eliminate this great headache of the cereal and other dry food processors, we have developed a new type stoner—revolutionary in design, amazing in efficiency, low in first cost, in operation. Removes stones, glass, non-magnetic metals, and all other hard, dangerous contaminations from cereals, soybeans, and other beans, and other food products with, 1) an action so sensitive the tiniest particles are easily removed; and 2) operating cost so low it is relatively insignificant; and 3) 99.9% efficiency. Capacity up to 16 tons per hour. *Write for Bulletin FI-445.*

SS&S
AIR-FLOAT
STONER



SUTTON, STEELE & STEELE, INC
DALLAS, TEXAS
In Canada—Kip Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign—Separations Engineering, Ltd., 133 Bush House, Aldwych, London

TOMORROW: CUSTOMERS WILL SHOP FOR OTHER ENRICHED FOODS

Taste will probably always be the largest single factor in determining the sale of a food. BUT that is no longer the whole story!

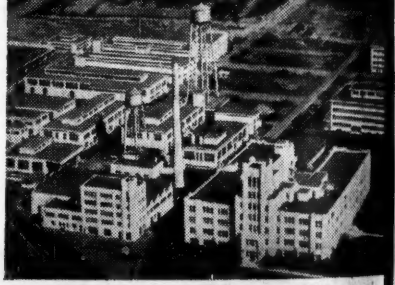
Housewives who have been studying nutrition, and men returning from the Services, have *experienced* the benefits of *improved* nutrition.

They are going to watch the labels for vitamin declarations, to pay particular attention to enriched values.

That is why the end of allocation of most vitamins has witnessed a renewal of the movement, by leaders in the food field, toward restoration and enrichment of certain foods hitherto profitable.

Are *you* sure *your* products will continue to appeal to the public as foods nutritionally well-rounded?

Why not consult our Vitamin Division?



HOFFMANN-LA ROCHE, INC.
Vitamin Division, Nutley 10, N. J.

FOOD INDUSTRY NEWS

DEVELOPMENTS IN DISTRIBUTION

Can Makers Are Short on Steel In Face of Increased Food Needs

WPB reverses trend toward greater use of metal containers, with needs for seasonal food items topping list

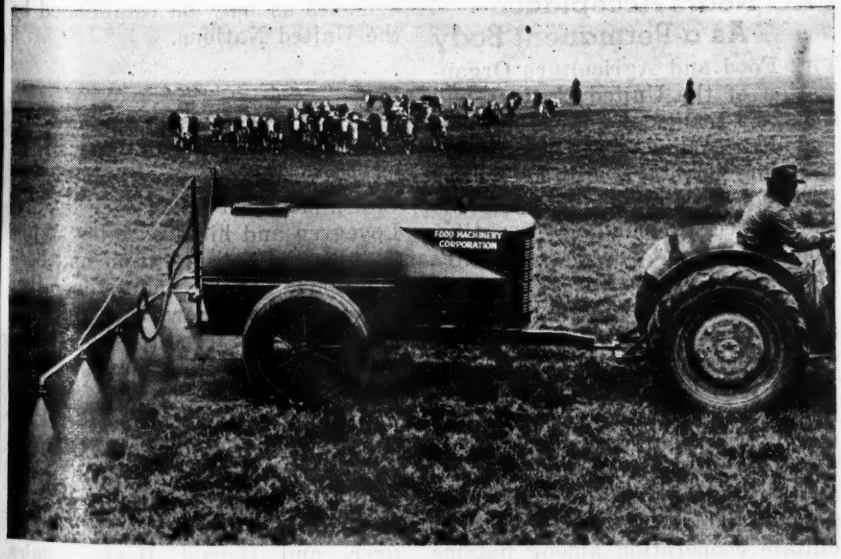
THE trend toward the use of metal containers has been reversed abruptly. Can manufactuers face a shortage of steel on one hand, and on the other, increased requirements of the military. In February, can manufacturers were told that the armed services would need from 20 to 25 percent more cans, in the second quarter of this year, than they used in the same period last year. This estimate has been raised by 5 percent. The time when the blackplate will be available for the additional food and nonfood uses permitted in the January 1 amendment of Order M-81, has been pushed back to late this year, if at all, by official estimates.

Less Available

The policy of WPB Containers Division has been clearly stated. Seasonal food requirements will be met before nonseasonal. Military requirements will be met before nonmilitary. Fewer cans will be available for civilian use in packaging less essential and nonfood products.

While the future is tied to the military situation, the official attitude is that an early collapse of Germany may not necessarily bring on an immediate reduction of military requirements for metal containers, or make more men available in the rolling mills or the can manufacturing plants. Conditions could deteriorate still further if production should be halted for any reason. Floods, as an aftermath of the heavy snows of the past winter, are a possibility that might stop operations of key facilities. According to present official estimates, food processors should plan to do with fewer metal containers—cans, pails and drums—for other than military orders.

Actual allocations for can manufacturing, in the second quarter, is 591,500 tons of prime steel plate and 15,000 tons of rejects. The industry had requested more than 700,000 tons.



VERSATILE POWER SPRAYER

In addition to its use as a killer of cattle grub and other destructive farm pests, this power sprayer, with its long hose and nozzle attachment, can be utilized for painting and whitewashing. It is being used here for spraying dry grass and hay with a mixture of molasses and water to make a more palatable range feed for cattle.

CCC and F&DA Agree On Disposal of Food

THE War Food Administration has accepted its moral obligations to conform to the requirements of the Food, Drug, and Cosmetic Act in the disposal of food products that find their way into ordinary distribution channels. An agreement was signed by Col. Ralph W. Olmstead, Director of the Office of Supply, Commodity Credit Corp., WFA's disposal unit, and Paul D. Dunbar, Commissioner of the Food & Drug Administration, on February 26. By this agreement, the procedure to be followed in the disposition of off-grade food stuffs has been reduced to writing. Under it, the Office of Supply assumes the responsibility for the denaturing, recleaning or relabeling of off-grade food stuffs, by making these operations an incident of the sale. In the future, contracts will provide that the work be carried out before the title passes to the purchaser, thus preventing many of the interagency conflicts that had been threatening.

ICC Issues Order for Egg Case Protection

THE Interstate Commerce Commission service order No. 288, governing shipment of shell eggs, is designed to prevent a recurrence of passed troubles. Last year, the use of poor cases, improperly covered, resulted in claims against railroads for about $500,000. This is several times larger than previous years. Many refrigerator cars were damaged and had to be removed from service and relined at the height of the season. The carriers had the additional cost of cleaning the cars while the country lost valuable food.

The order, effective March 15, came far enough ahead of the flush season of egg production to permit shippers to anticipate their needs. An estimated 22,000,000 cases will be needed for shipment by rail, and these can be supplied.

The order specifies the manner of stowing and blocking the cars to prevent shifting of loads. In the past, big shippers have fully realized the necessity of carrying out the provisions now incorporated in the order. Smaller shippers, who have been negligent in following good practices, must now do so.

Help Wanted: Urgent

Food chemists, food technologists or food engineers with experience in any phase of food processing, and who are now in the military forces in either the European or Mediterranean Theater of Operations, are needed for important work for the Army. If any such men of your acquaintance, or from your company, are now in Europe, please notify us at once, giving:

Name .....
Specialty .....
Company where formerly employed.....
.....
Present military address:
Rank .....
Number .....
Organization .....
A.P.O number .....
c/o Postmaster, New York

Don't delay. The need is urgent. Write to the Editor of FOOD INDUSTRIES, 330 West 42nd St., New York 18, N. Y.

Verdict Set Aside in OPA Milk Price Case

THE Federal Court Jury verdict, rendered March 15 at Wausau, Wis., in favor of the Sand Creek (Wis.) Creamery in a suit by OPA, was set aside by Federal District Judge Patrick T. Stone, March 19. OPA is suing for violation of ceiling prices in the sale of roller process whole milk powder.

This ruling was made despite the fact that the jury gave its verdict after hearing evidence for six days. Judge Stone ruled the verdict was contrary to evidence, but denied an OPA motion for judgment against the creamery at this time. A new trial was set for the Federal Court term commencing April 10.

A similar suit against the Cashton (Wis.) Cooperative Creamery, which began March 19, was postponed awaiting final action in the Sand Creek case, which OPA attorneys had claimed was a test case.

The suit against Sand Creek Creamery is one of 16, filed last July, against Wisconsin creameries in which OPA asked more than $1,000,000 damages.

Government Food Stocks

THE turnover of government-owned stocks of canned foods has progressed rapidly and satisfactorily, as indicated by the official figures released the first of March. At the first of the year government-owned stocks were largely made up of items of the 1944 pack. Of the total stocks owned by War Food Administration on December 31, 1944, 79 percent was packed in that year. Less than 1 percent of the War Food Administration's holdings were packed in 1941, approximately 3 percent in 1942, and only about 17 percent in 1943.

IFT Papers May Be Read At Regional Meetings

IN canceling the annual convention of the Institute of Food Technologists, scheduled for Rochester, in May, the Institute's council paved the way for the acceptance and publication of the papers that would have been featured at the meeting. The council also arranged for the presentation of the Nicholas Appert Medal to Dr. A. W. Bitting, now of Lafayette, Ind.

The committee on programs was instructed, by the council, to proceed with its invitations and negotiations for papers on food technology, particularly those relating to methods and practices that contribute to the preservation of the nutritive value of processed foods. The various sections, throughout the country, are being invited to arrange regional meetings—probably afternoon and evening sessions—on a convenient day in May, when the papers from their geographical area will be read.

The presentation of the medal to Dr. Bitting will be made at the regular meeting of the Chicago section, May 21.

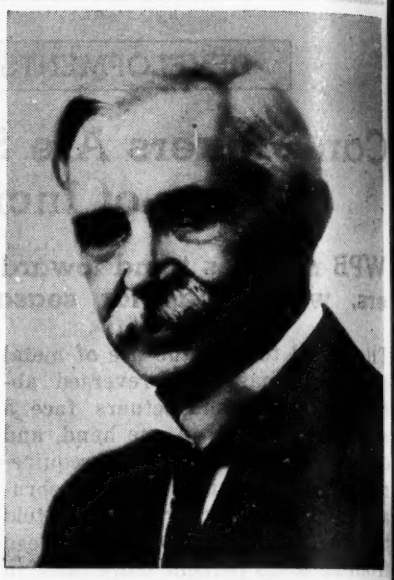
Except for the canceled conference, the activities of the Institute will proceed as usual with the election of officers, holding of a summer meeting of the council—when the ballots will be counted—and publication of the IFT proceedings.

FAO Nears Acceptance As a Permanent Body

THE Food and Agriculture Organization of the United Nations will soon be a reality. Eighteen nations, including China and the United Kingdom, have agreed to accept the FAO constitution. Only 20 nations are needed to bring the constitution into force. The United States has not as yet taken action, but President Roosevelt submitted the matter to Congress during the last week in March.

The purposes of the FAO are to improve agricultural production and distribution, raise the levels of nutrition and standard of living, and better the conditions of rural populations. It is expected to facilitate cooperation among nations and serve as an expert advisory center for all the nations involved.

Provision is made in the constitution for the FAO to become a part of any general world organization, such as that projected at Dumbarton Oaks. It will also be coordinated in function and will collaborate with the International Labor Organization, the proposed International Bank and the International Monetary Fund, as well as such other economic and social agencies as may be established by the United Nations.



GETS IFT AWARD

Dr. A. W. Bitting has been chosen by the Chicago section of the Institute of Food Technologists to receive the 1945 Nicolas Appert Medal. Dr. Bitting has been distinguished as a food technologist since 1907. In recent years he has been a director of research with the Glass Containers Association, and a consultant in food technology. He is also the author of "Appertizing or the Art of Canning."

New Owners Take Over Signet Brand Plant

U. S. PRODUCTS Corp., San Jose, Calif., has been taken over by Carl Lovegren and his associates. While no financial consideration has been mentioned, it is understood that there will be a new issue of stock offered to the creditors of U. S. Products Corp. for financing purposes. Lovegren, who was formerly president of Hunt Bros. Packing Co. and the California Canners League, has been named as president and general manager; John Gallois, vice-president and treasurer, and Donald Hooper, sales manager.

U. S. Products Corp. are owners of the "Signet" brand and were western pioneers in packing fruits

There's G-E in every LINK
of the frozen food industry

For uniform performance in every link, from the processing plant to the retail display case, the G-E Condensing Unit is on the job, keeping food at top quality . . . and operating costs 'way down.

To assure the maximum refrigeration output with the minimum consumption of current; and to keep maintenance costs low; G-E builds, tests, and retests every part of the G-E Condensing Unit in its own factories.

☆ BUY . . . and hold . . . WAR BONDS ☆

General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 5893, Bloomfield, New Jersey.

GENERAL ELECTRIC

Tune in: The "G-E HOUSE PARTY," every afternoon, Monday through Friday, 4 p. m., E W T, C B S . . . The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 P. M., E W T, N B C . . . "THE WORLD TODAY" News, Monday through Friday, 6:45 P. M., E W T, C B S

DID YOU SAY YOU WANT ADJUSTABILITY?

ALL WRAPPED ON A SINGLE FA MACHINE

...just take a look at this!

The largest package in this group is 13″ x 7″ x 3″; the smallest, 7″ x 2″ x 2″. All eight packages are wrapped on a single quickly-adjustable FA model, which we recently built for the Grocer's Biscuit Company.

The machine applies printed waxed-paper wrappers, cut from a roll, and registered by Electric Eye, at a speed of 30 to 60 packages per minute, depending on size. Changes from one size to another are easily made by hand-wheel adjustment.

In addition to adjustability, our machines offer practically unlimited scope in the choice of wrapping materials. This means you can readily take advantage of new developments that are taking place in the wrapping materials field, thereby obtaining the most effective selling features for your package. *In short, we aim to build machines that can keep pace with modern packaging trends.*

Write for our booklet "Sales Winning Packages"

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts

30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Ave., Cleveland 15 • 443 S. San Pedro St., Los Angeles 13
32 Front St., W., Toronto 1

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

and vegetables in glass. In 1943 the corporation was thrown into bankruptcy. While still in bankruptcy, Gallois took over as president and, in conjunction with a creditor's committee, operated the plant. The corporation has now been taken out of bankruptcy.

WFA May Recommend Food Help Deferment

THE War Food Administration, according to the regulations of the Selective Service System, has the responsibility and authority of recommending, for deferment, employees of the food industries who are essential in their jobs. WFA members of the Production Urgency and Manpower Priorities Committee are available to help employers in the food industries to determine the possibilities of deferment for key men in their employ.

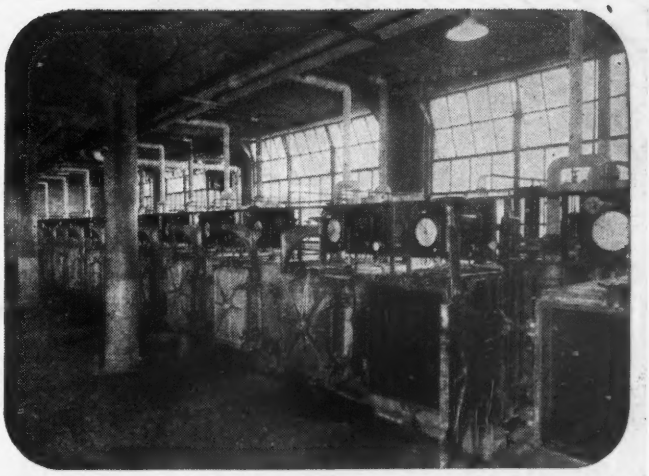
Eligible for deferment are men under 30 who were classified 2-A or 2-B on January 1, and who are indispensable in an activity included in the War Manpower Commission list of essential activites. The industries for which the WFA has authority to certify employees for deferment include: Fruit and vegetable canning, packing, freezing, dehydrating, meat packing, poultry dressing and products, fats and oils, grain products, dairy products, sugar processing, fertilizer, and ice manufacture and harvest.

Certification is not mandatory upon the local Selective Service board. The board still has the final words, but there is machinery for appeal. Employers who do not already have sufficient information on the subject of deferment may obtain it through the local Production Urgency and Manpower Priorities Committee or from the WFA district representative.

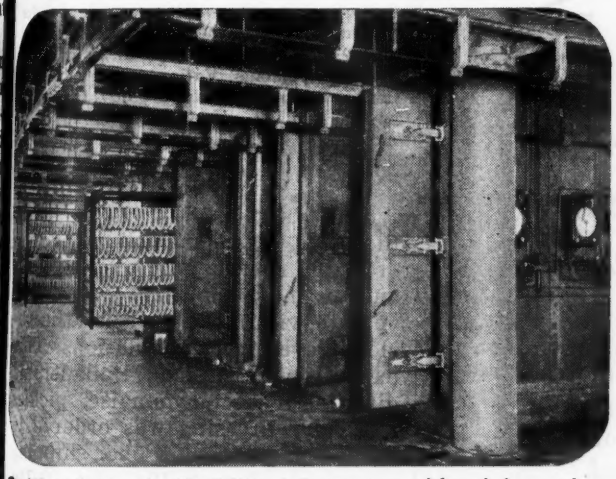
WPB Cracking Down On Priority Violators

OPERATIONS of the compliance division of the War Production Board are becoming more vigorous. There has been a recent increase in decisions against industrial firms that have not kept adequate records as provided in Priority Regulation No. 1. This would indicate, say the spokesmen of the compliance division, that there is a feeling that a relaxation in the requirements will follow victory in Europe. There is no promise that this is the case, and the possibility of any relaxation when Japan is defeated is not in the cards.

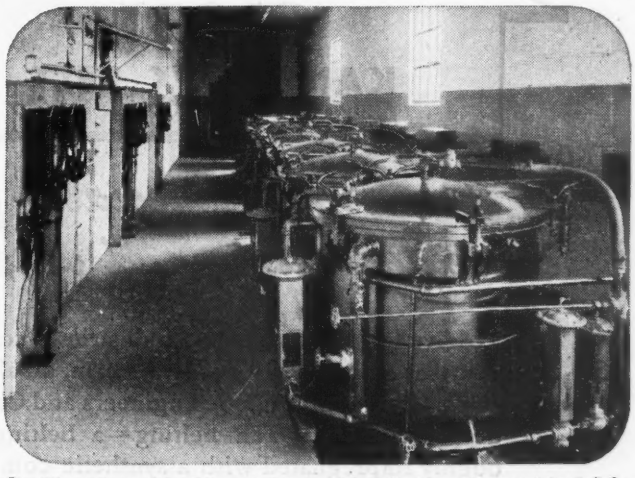
WHAT CAN WE DO FOR YOU?



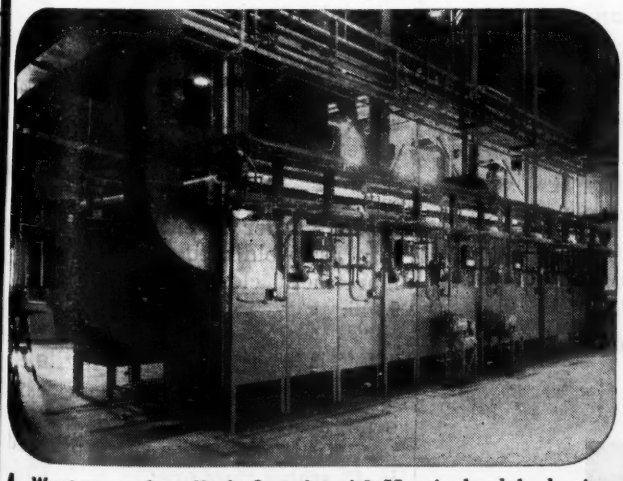
1. Want automatic operation of horizontal retorts? At Cudahy Packing Company's South Omaha plant (above) Taylor Fulscope Controllers equipped with built-in Process Timers provide complete and accurate automatic timing in addition to precise temperature control. All operator has to do is load retort and start the process.



2. Want better quality hams and sausages with minimum loss of weight due to shrinkage? You need an air-conditioned smokehouse with Taylor automatic controls. Thanks to accurate wet-and-dry bulb temperatures maintained by Taylor Fulscope Controllers, John Morrell and Company, Ottumwa, Iowa (above) report greatly increased production and more uniform products than before.



3. Want better looking, better tasting fruits or vegetables? The Taylor 2-A Retort Control system, shown here at Walt Wegner Foods Inc., Williamson, N. Y., is about the last word in automatic retort control for large tins and glass packages. Yet it actually saves you money in increased uniformity and decreased waste. Mr. Wegner says he'd "hate to go back to the old way" and so would you if you tried this system.



4. Want to see how Uncle Sam does it? Here's the dehydrating tunnel at the Western Regional Laboratory of the U. S. Department of Agriculture at Albany, California. Much of the original dehydration technique was developed here with the help of Taylor Accuracy. Note the Taylor Fulscope Indicating Controllers which keep temperatures "on the beam".

ARMY E NAVY

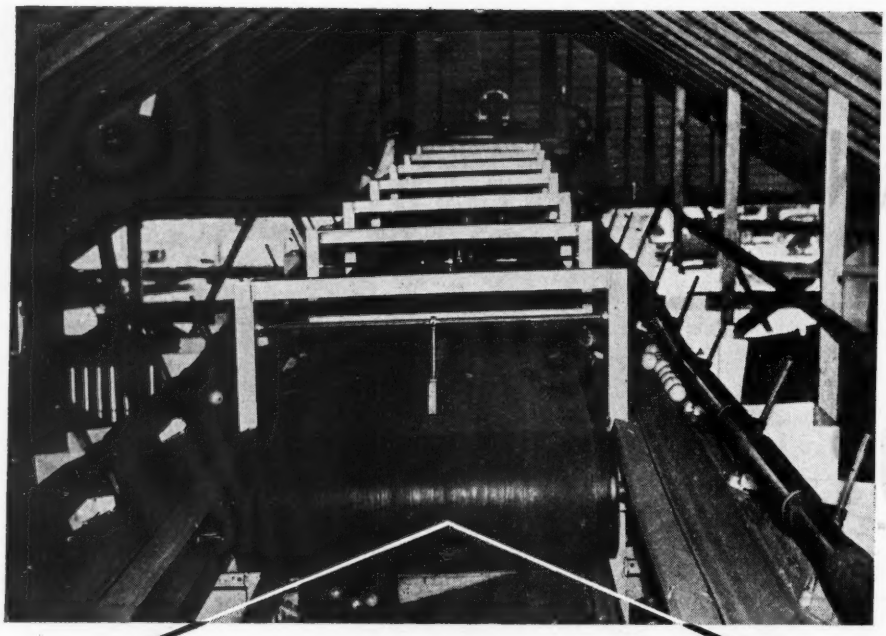
Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

5. Whatever your food processing problem — whether it's fruit or vegetables in tin or glass, meat packing, milk products, baking, candy making or dehydration, Taylor has or can develop a system to meet your exact requirements. Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.



GLOBE
KANRY-TEX BELT

Developed especially for conveying fruits and vegetables

To give food and canning industries a conveyor belt that resists moisture, live steam, alkali, food acids, fats and oils, Globe Engineers and Chemists developed Kanry-Tex belting—a belting thoroughly impregnated with a synthetic compound.

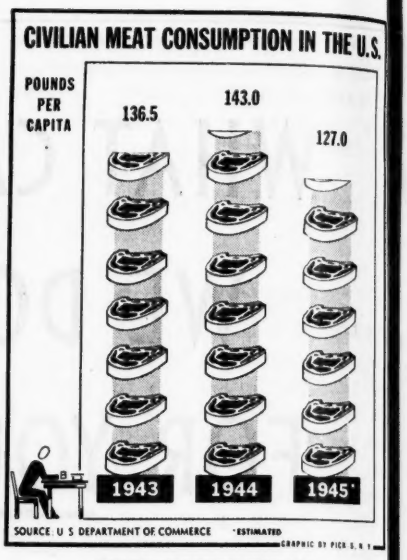
This impregnation gives you a conveyor belt that doesn't crack or peel, is easy to clean, meets sanitary standards! The impregnation offers these other advantages too:

1. **Does not deteriorate with age**
2. **Allows practically no water absorption**
3. **Adds to the life of the belt**
4. **Is odorless and tasteless**

Such a conveyor belt finds many and varied uses in food and canning industries. It is supplied in either white or brown color, the white used for contrast purposes on inspection belts.

Globe Kanry-Tex is economical, well worth investigating before purchasing your next conveyor belts. Don't delay getting detailed information on Globe belting. Write today to mill supply houses or directly to us.

GLOBE WOVEN BELTING CO.
1396-1400 CLINTON STREET
BUFFALO, N. Y.



MEAT CONSUMPTION

While this Department of Commerce estimate for our 1945 civilian meat consumption is relatively low, it is now anticipated that actual supply will go even lower, due to heavy government buying for the armed forces and Lend-Lease, which includes the Yalta agreements. Various relief plans are being considered, including government inspection of all packing plants so as to make all meat available for interstate commerce.

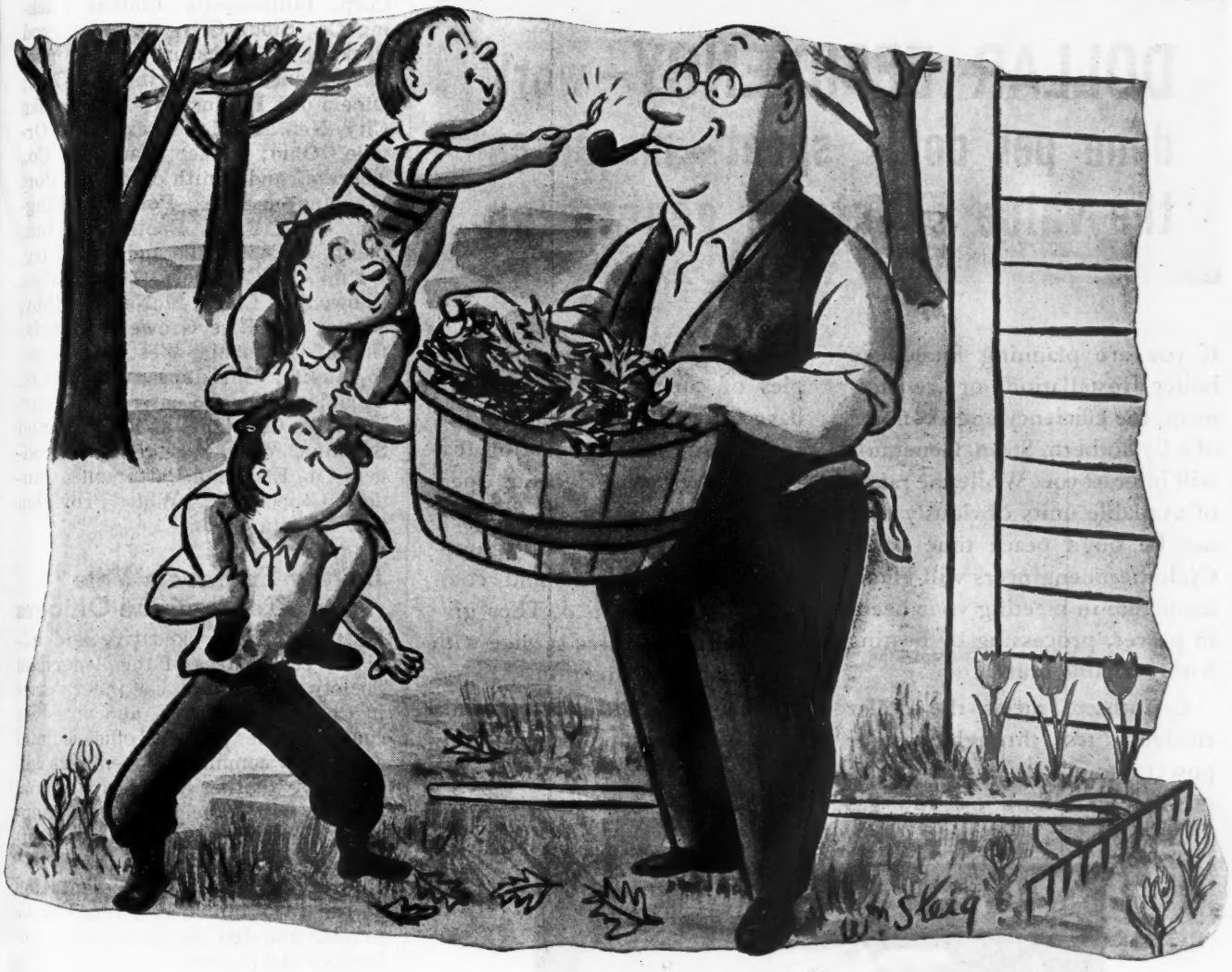
The compliance division, early this year, stated its policy was one of trying to keep people in business and at the same time have them operate within the terms of the various government regulations. This explains why a small Philadelphia distributor of mayonnaise, pickles and salad dressing was ordered to reduce his use of new fiber shipping containers during 1945 by 10,740 lbs. The order resulted from the overuse during the second, third and fourth quarters of last year of fiber shipping containers weighing over 40,000 lb. This apparent light slap on the wrist should not be misunderstood.

An example of the more drastic penalties is the case of the Ellis Canning Company of Denver, Colorado. Last year this concern received 2,936,090 new metal closures in excess of the minimum working inventories provided in PR 1. In a consent order recently issued, this firm is prohibited from receiving more metal closures until March 1, 1946.

"A" Awards for 22 Plants

TWENTY-TWO more food plants have been awarded the War Food Administration's "A" award. Situated in 13 states they are:

Doughnut Corp. of America, Ellicott City, S. E. W. Friel, Wye Mills, Md.; Chicago Western Corp., Chicago; Mid-State Frozen Egg



"The bigger the family—the better the service"

THAT'S TRUE of businesses as well as families! Continental's family offers you technical skill, varied experience, extensive resources and facilities. This combination guarantees you complete service and the ideal package for your product.

Our packaging experts and engineers will analyze your problem impartially. Our great variety of containers assures you of the very one you want.

We make all kinds of packages now—metal containers, liquid-tight paper containers and cups, fibre cans and drums, steel pails and other heavy-duty containers.

Right now we're busy serving Uncle Sam. But keep your eye on Continental! And on Continental's trademark, too. The Triple-C stands for *one* company with *one* policy—to give you only the very best in quality and service.

Tune in: "REPORT TO THE NATION" *every Saturday over coast-to-coast CBS network*

Continental Fibre Cans—These composite cans meet a definite packaging need. They're ideally suited to specific container uses. They bridge the gap between bags, folded boxes, paper containers and all-metal cans. They're made for easy conveyor and filler handling, in all shapes and sizes. They're built for endurance, long shelf life and perfect protection of their contents. Individually styled for eye- and sales-appeal as well as compact neatness, they're "naturals" for safeguarding products such as cereals, cocoa, spices, grated cheese, powdered milk, dehydrated vegetables, soap, drugs, cosmetics, seeds, chemicals, pet foods, and innumerable other products.

CONTINENTAL CAN COMPANY, INC.

CONTINENTAL PAPER DIVISION

FIBRE DRUMS The Container Co., Van Wert, Ohio

LIQUID-TIGHT FOOD CONTAINERS Boothby Fibre Can Co. Roxbury, Mass.

PAPER CUPS Mono Containers, Newark, N. J.

COMBINATION PAPER AND METAL CONTAINERS
Headquarters: 330 W. 42d St., New York 18, N. Y.

13 Plants—Sales offices in all principal cities

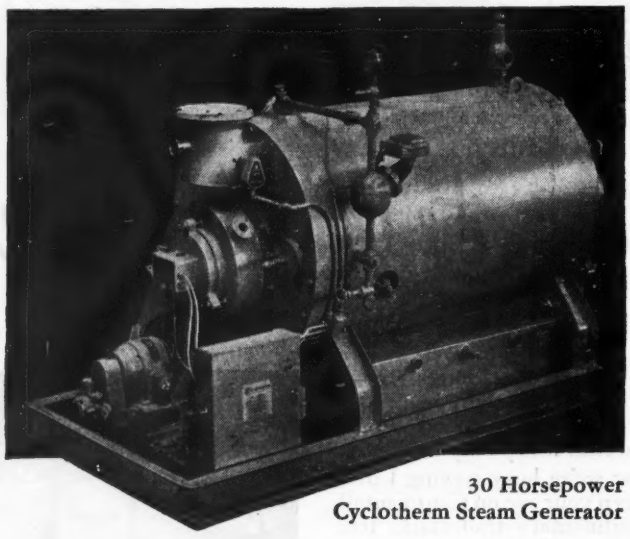
DOLLAR EFFICIENCY—work done per dollar spent—measures the value of steam generation

If you are planning immediate boiler installation or replacement, the efficiency and economy of a Cyclotherm Steam Generator will interest you. While the range of available units obviously cannot be on a peace time basis, Cyclotherm engineers will gladly cooperate in meeting your needs in power, processing or heating with available units.

Cyclotherm meets the dollar efficiency test through a wide power range (10 to 300 horsepower) with both oil and gas fired units. Its exclusive principles of combustion and design have proved Cyclotherm's dollar saving and dollar making capacity under most rigorous operating conditions.

Cyclotherms are fully automatic, sturdily built and completely self contained. They give years of trouble free service with a minimum of attention.

Detailed additional information will be supplied promptly upon request. Our engineers are available for consultation.



30 Horsepower
Cyclotherm Steam Generator

CYCLOTHERM
STEAM GENERATOR

AMES IRON WORKS
OSWEGO . . NEW YORK . . BOX 701

Corp., Indianapolis; Cudahy Packing Co., Sioux City, Ia.; Absogood Packing Co., Jackson, and Producers Produce Co., Springfield, Mo.; Otoe Food Products Co., Nebraska City, Neb.; J. M. Smucker Co., Orville, Ohio; Baker Canning Co., Theresa, and Smith Bros. of Port Washington, Inc., Port Washington, Wis.; F. N. Booth Co., Inc., plants at Centerville and Pittsburg, Danish Creamery Association, Chowchilla, Libby, McNeil & Libby, Selma, and Rice Growers Association of California, West Sacramento, Calif.; Christensen Meat Co., Tillamook, Ore.; Centennial Flouring Mills Co. plants at Ritzville and Spokane, Wash.; Engleman Products Co., Elsa, and Patterson's Cannery, Cooper, Tex.; White Provision Co., Atlanta.

Bakery Engineers Vote To Continue Officers

MEMBERS of the executive and advisory committees of the American Society of Bakery Engineers met in Chicago, in March, and voted to continue the present officers and executive committee members in office for another year. No formal election will be held because of cancellation of the 1945 annual meeting.

Papers prepared for presentation at the 1945 annual meeting will be printed and distributed to the members of the Society.

A new standing committee on bakery production personnel was established.

Tentative dates for 1946 meeting were set for March 11-14 at Edgewater Beach Hotel, Chicago.

Frozen Food Studies Now Available

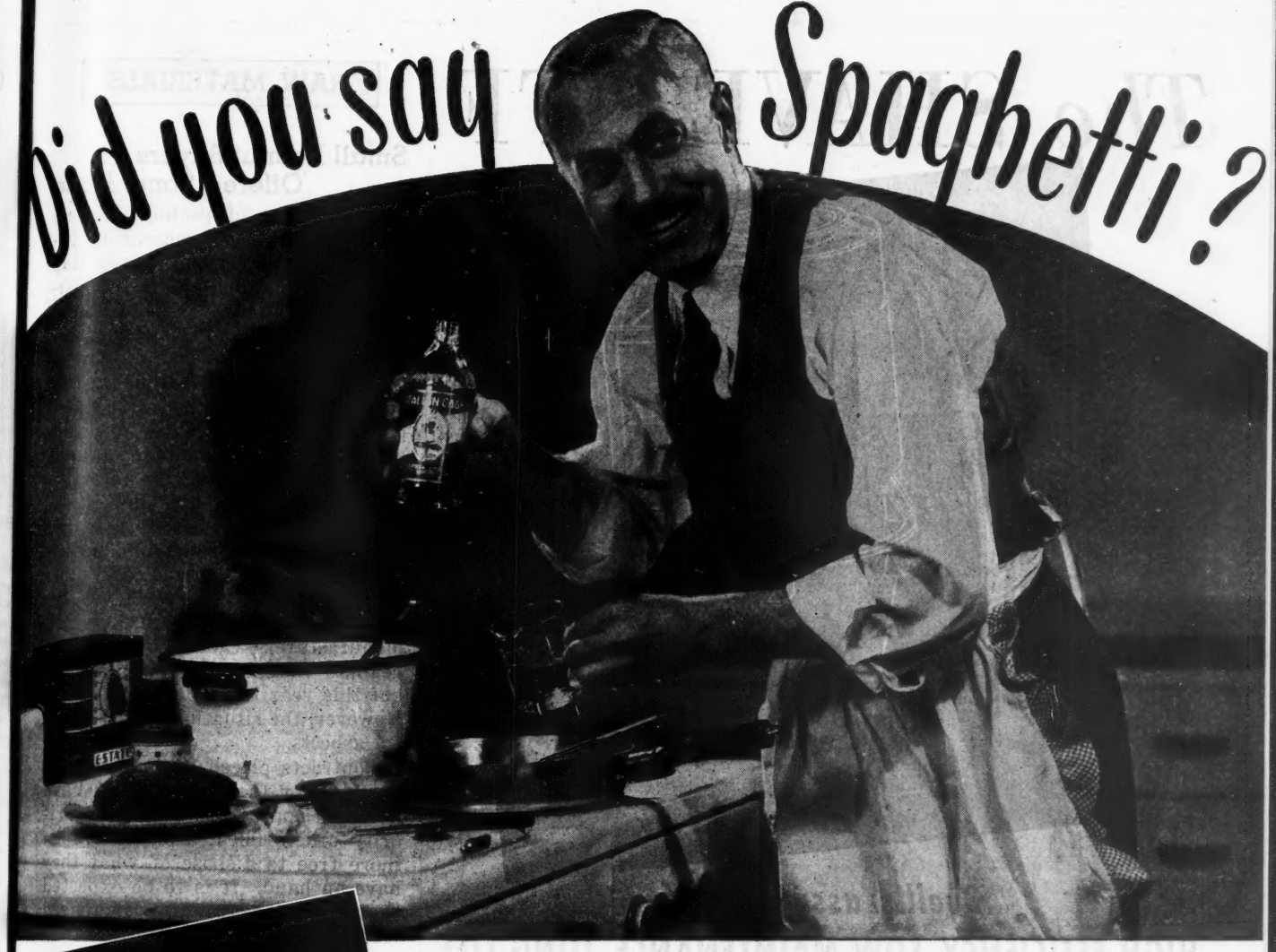
Food processors who are engaged in the production of frozen foods, those debating whether they should enter that industry, and those using frozen foods may be interested in two frozen food studies published by "Food Industries."

One of these is in the form of reprints of the special report "Frozen Foods—the Past, the Potential," which appeared in the March issue of "F. I." An 18-page section, with 35 production charts printed in three colors, it gives the past production and forecasts the future potential of the 30 most important frozen fruits and vegetables. The text discusses each product, not only with respect to production trends and possibilities, but the particular problems encountered and sizes of containers used. This reprint sells for $1.00.

The other frozen food study available is the 1945 edition of the "Frozen Foods Directory," which lists the commercial packers and their executives, brands, products, types of containers, freezing systems used and location of freezing plants. It is a who, what, where and how manual of the frozen food industry. The price of this is 50 cents.

—The Editors.

Did you say Spaghetti?



Take half a cup of Italian Cook Salad Oil. Add one finely chopped onion, one garlic clove, one pound of ground beef. Here is the start of a real taste treat . . . Spaghetti Caruso.

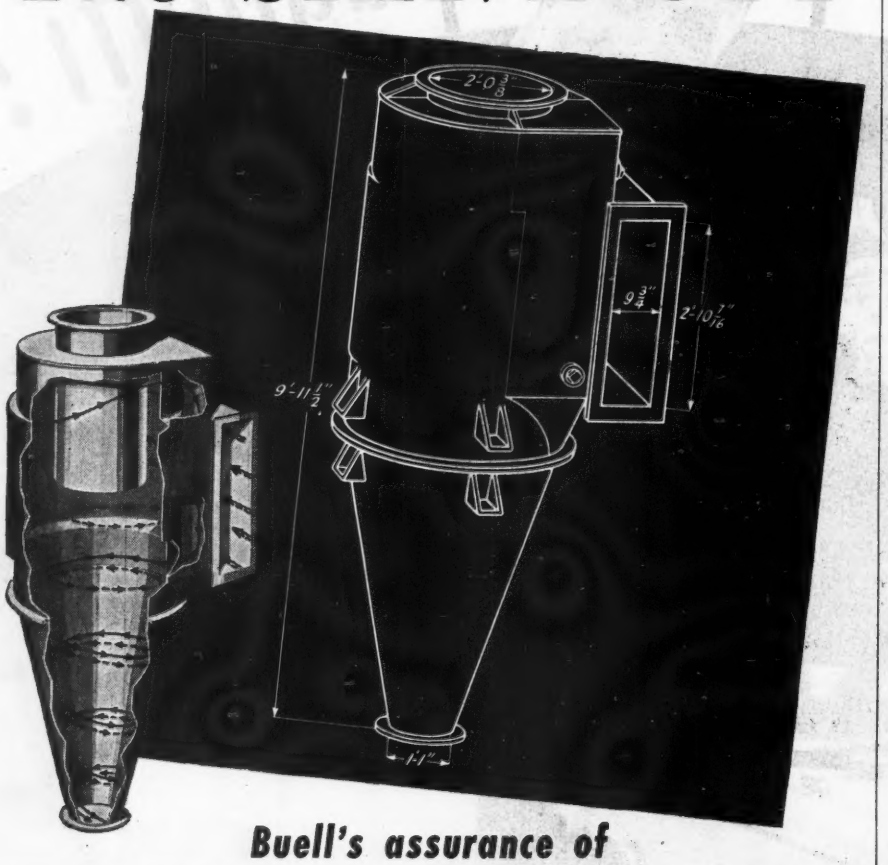
Packed by the Italian Cook Oil Corp., Brooklyn, N. Y., Italian Cook is a popular brand of salad oil for making sauces, cooking and frying. It is also recommended as a base for the preparation of salad dressings. Like so many popular products, Italian Cook Brand Salad Oil is sealed with a colorful Crown Screw Cap. An exclusive feature, the Deep Hook Thread not only makes it easy to apply and remove. It gives 50% to 100% more sealing pressure with the same amount of application force.

Crown Cork & Seal Company, Baltimore 3, Md.

World's Largest Makers of Metal Closures.

CROWN CLOSURES

The SHAVE-OFF



Buell's assurance of
HIGH EFFICIENCY, LOW MAINTENANCE, LONG LIFE

SUCCESSFULLY utilizing the "double-eddy" current—an aero-dynamic phenomenon present in all cyclone-type collectors (established by van Tongeren)—Buell, and Buell *only*, effectively puts this force to work by an exclusive mechanical feature known as the "Shave-off". By means of this design feature, the important "fines" are collected and by-passed to the lower part of the cyclone where the downward flow of the "double-eddy" current automatically carries them to the dust discharge outlet.

In ordinary cyclones, this dust circulates under the top plate, finally dropping by gravity through the upward, rotating gas stream of the "double-eddy" current. Thus, in its passage to the dust discharge outlet, the "fines" become re-entrained in the gas flow and are partially lost through the gas outlet.

This exclusive feature of the patented Buell (van Tongeren) cyclone is a prime factor in Buell's well-known high recovery efficiency.

BUELL FEATURES

SHAVE-OFF
LARGE DIAMETERS
EXTRA-STURDY CONSTRUCTION
CORRECT HOPPER DESIGN
SPLIT-DUCT MANIFOLDS
INNER WELDS GROUND SMOOTH

RESULT IN

HIGH COLLECTION EFFICIENCY
LESS FAN BLADE WEAR
LOW DRAFT LOSS
LOW POWER CONSUMPTION
HIGH TEMPERATURE RESISTANCE
UNLIMITED CAPACITY
NO MOVING PARTS
FREE DUST FLOW

PRODUCE

HIGH EFFICIENCY
LOW MAINTENANCE
LOW OPERATING COST
LONG LIFE
NO CLOGGING

buell
DUST RECOVERY SYSTEMS

Convincing facts about the "Shave-off" may be found in Buell's bulletin—*"The van Tongeren System of Industrial Dust Recovery"*.

BUELL ENGINEERING COMPANY, INC.
Suite 5000, 8 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

RAW MATERIALS

Small Peanut Buyers Offered Some Hope

SMALL buyers of peanuts are expected to experience increasing difficulty in finding supplies, reaching a peak immediately before the marketing of the early crop in Texas. While there will be some hardship cases among the manufacturers, the public is expected to find a fair supply of peanut butter and salted peanuts in the retail stores and even occasional supplies of peanut candy. But the candy manufacturer, in particular, may find it desirable to select some alternate use for his labor force and manufacturing facilities during July and August.

The fact that some of the small manufacturers cannot buy all the peanuts they need is not unusual, but this year the shortage is acute. However, the situation has its hopeful aspects.

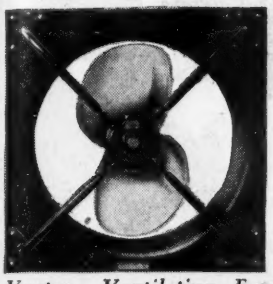
Contracts placed by the military services for the current year have not been approved. With these priority orders filled, shellers will be more free to dispose of what they have on hand. It is to be expected that with the resulting increased freedom, shellers will find that they have more peanuts than they have previously indicated.

Another favorable aspect is that the crop of Virginia type peanuts is the best quality in years and the yield of the nut meats has been greater than anticipated. Manufacturers that can use this type may find them in better supply than Spanish and Runners.

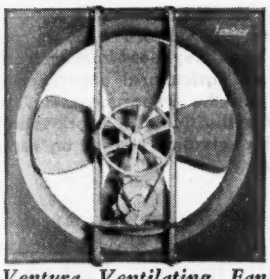
In March, the government released from the set-aside stockpile of Virginia type shelled peanuts approximately 30,000,000 lb. for civilian consumption. In addition, about 20,000,000 lb. of shelled peanuts have been sold in Texas. These peanuts from the CCC stockpile will be available to candy people, salters and manufacturers of peanut butter.

Small processors would do well to check with peanut wholesalers and jobbers who might possibly have available stock. This year, wholesalers seem to be in the picture to a greater extent than for some time. In certain areas they are being called merchandising brokers. While peanuts from these sources mean an extra cent a pound in the cost, they might prove to be the place where the peanuts can be purchased.

AMERICAN BLOWER

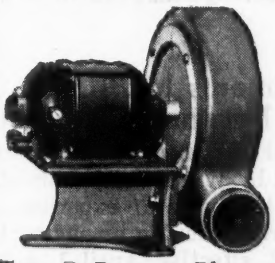


Ventura Ventilating Fan with direct connected 2-speed fully enclosed motor.

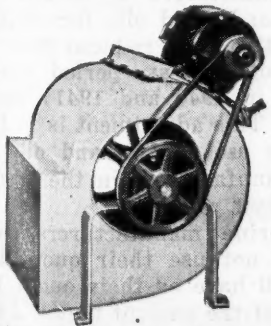


Ventura Ventilating Fan with V-belt drive.

ABC Utility Set for ventilating with a duct system.

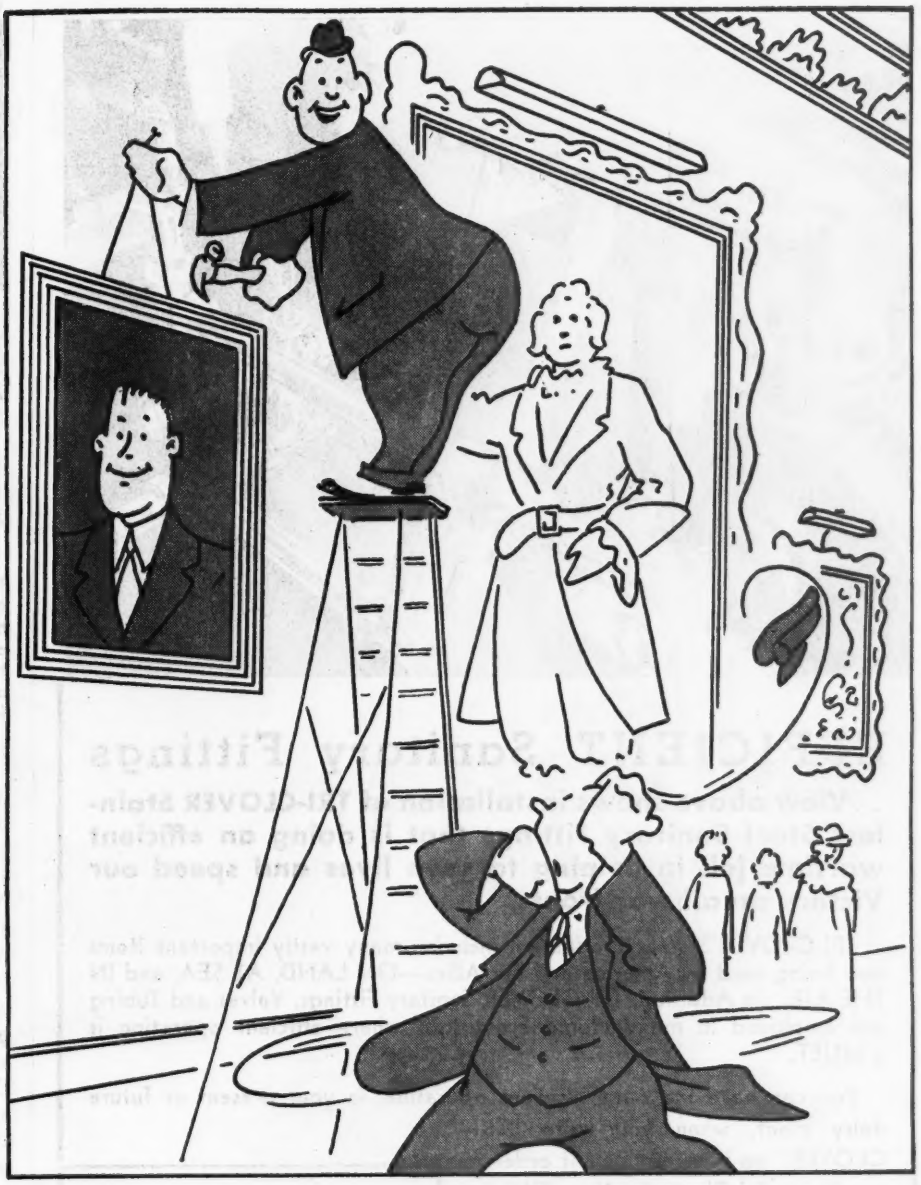


Type P Pressure Blowers.



ACF Fan with V-belt drive.

Other fans to meet every air handling need.



"There," he said, "is where it belongs!"

"I FEEL so good about our new Ventilating System," writes a nationally known manufacturer, "I wouldn't hesitate to recommend American Blower equipment to anyone.

"THE CONTRACTOR who installed it did a swell job, too. When a man does a thorough job these days, you ought to put his picture in the museum along with the old masters.

"THERE is where it belongs. I feel like placing our contractor's picture there myself."

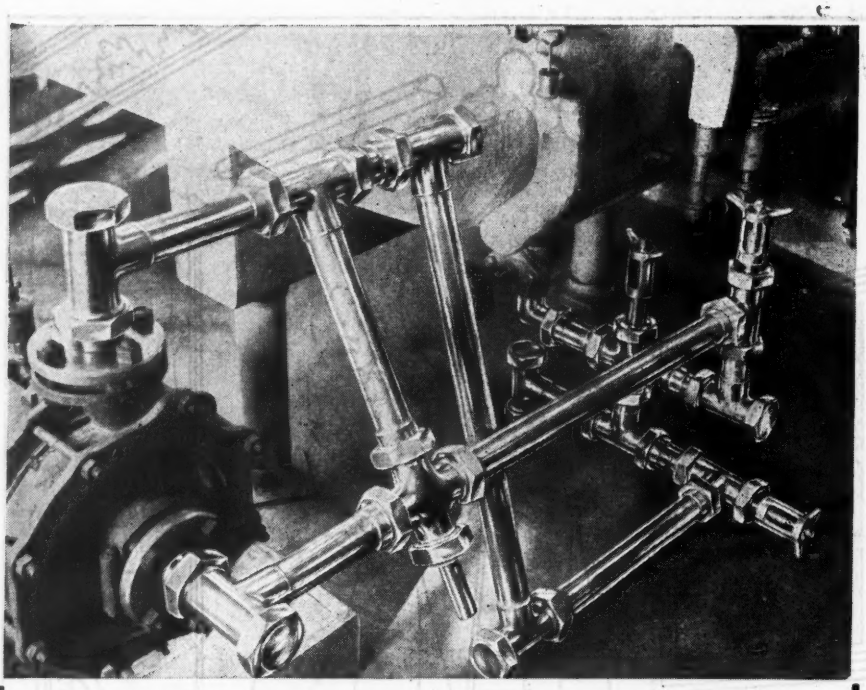
TIP-OFF—You can get a swell job on any problem of ventilating, air handling and exhausting from your local Ventilating Contractor or Dealer.

AND YOU will be sure of getting complete satisfaction if you ask for American Blower Equipment.

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT, MICH.
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONT.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION



EFFICIENT Sanitary Fittings

. . View above shows installation of TRI-CLOVER Stainless Steel Sanitary Fittings that is doing an efficient wartime job in helping to save lives and speed our Victory on all war fronts.

TRI-CLOVER'S War Production includes many vastly important items now being used by America and her Allies—ON LAND, AT SEA, and IN THE AIR. In Addition, TRI-CLOVER Sanitary Fittings, Valves and Tubing are employed in many Home Front jobs where efficient operation is a MUST.

You can have the same efficient operation, in your present or future dairy plant, when you write "TRI-CLOVER" on your equipment order in specifying Tri-Clover Sanitary Fittings, Valves and Tubing. They are ***Dependable, Reliable*** and ***Accurate.***

Confidence in the efficiency of all our Sanitary Valves and Fittings is evidenced by the stamping of "TRI-CLOVER" on each one—for your and our protection. Insist on TRI-CLOVER when you order. Write for our Catalog.

THE *Complete Line*

1. Trialloy (Cupro Nickel) Sanitary Fittings
2. Fabricated Stainless Steel Sanitary Fittings
3. Pumps (Centrifugal—non-agitating) Trialloy and Stainless Steel
4. Custom Fabrication
5. Sediment Testers
6. Line Filters

Standardized Accuracy and Interchangeability are YOUR Tri-Clover Guarantee.

ARMY E NAVY

TRI-CLOVER MACHINE CO.

2814 60th Street

KENOSHA, WISCONSIN

TRI CLOVER

"THE *Complete* LINE"

HONEYBEES HELP

The sizable pile shown here is pollen, gathered by honeybees from millions of blossoms for agricultural experimentation, conducted by the Department of Agriculture at Beltsville, Md. The work is in connection with advance studies on essential food crops.

Prospects for next year do not indicate that the supply situation will greatly improve. Last year the prisoners of war were of great assistance in harvesting the crop. Nevertheless, there was a labor shortage and this shortage is expected to be even more acute at the time of the coming harvest. If for any reason the growers cannot get prisoners of war or other labor in sufficient quantity to take care of their harvest, the yield will be much smaller than planted acreages would indicate. As a general thing, the growers' attitude is against planting any acreage that cannot be harvested.

Adjustments Made in Fats and Oils Quotas

FATS and oils allocations have been adjusted by War Food Administration on the basis of experience of last year. Under an amendment to WFO 42, effective April 1, quotas for manufacturers of shortening, cooking and salad oils for civilian consumption were reduced from 88 percent of the base period (average use in 1940 and 1941) to 85 percent. This adjustment is in line with the use of fats and oils by these manufacturers in the second quarter last year.

Margarine manufacturers, who also did not use their quota last year, will have as their quota 120 percent of the amount they did use in the same calendar quarter last year. The amendment removes the spread between actual use and permitted use, which prevailed a year

Plan Now to Invite Them In

with MEYERCORD WINDOW SIGNS!

Point the way to purchasers with Meyercord Decals, the colorful commanding tie-up between your advertising and the place where it "pays off"—your dealer.

More than that you *invite* them in to buy with messages on the most powerful media in the world—the show windows of America where "impulse" buying goes into action.

And your dealer welcomes the "dress-up" your window signs and valances give to his business, and trades you for it his cooperation, the most potent force in merchandising. Free designing service. Address inquiries to Dept. 65-4.

Buy War Bonds...and Keep Them

THE MEYERCORD CO.

World's Largest Decalcomania Manufacturers

5323 WEST LAKE STREET . . . CHICAGO 44, ILLINOIS

LO-BAX
50% available chlorine

LO-BAX SPECIAL—a superior chlorine bactericide in granular form—packed in 2½-lb. bottles, ½ doz. to the case; and in 14-oz. bottles, 1 doz. to the case.

LO-BAX POWDER—a highly efficient chlorine bactericide packed in 28-oz. bottles, 1 doz. to the case.

THE KEY TO QUALITY CONTROL

LO-BAX, the concentrated, fast-killing chlorine bactericide, is the key to quality control in thousands of food plants . . . prevents food spoilage, improves quality standards by controlling bacteria, keeping down mold, sanitizing all surfaces with which food comes in contact.

Simple and easy to handle—Lo-Bax kills bacteria almost instantly on contact . . . and at amazingly low cost. Dissolves quickly in water—hot or cold, hard or soft—to make clear chlorine-rinse solutions. Containing 50% available chlorine, Lo-Bax maintains its strength as packed in the original container.

Make Lo-Bax the key to quality control over your products. Write for helpful information.

Mathieson
LO-BAX
CHLORINE BACTERICIDE

THE MATHIESON ALKALI WORKS (INC.) • 60 East 42nd Street, New York 17, N. Y.

Lo-Bax Powder · Aqua Ammonia · Super-Nufos · H T H-15 · Caustic Soda · Soda Ash · PH-Plus · Dry Ice · Bicarbonate of Soda · Synthetic Salt Cake · Carbonic Gas · Liquid Chlorine · Sodium Chlorite Products · Ammonia, Anhydrous & Bleaching · Sodium Methylate

ago when production was below permitted quotas.

The amendment also changed the order's definition of a manufacturer by adding: "A person who merely blends fats and oils shall not be deemed a manufacturer." Another change corrects the description of an edible product, in the manufacture of which, fats and oils are quota exempt.

Kraut Program Fixed For Southern Cabbage

BECAUSE winter cabbage production is about 56 percent above average and considerably in excess of current requirements for civilian consumption, the War Food Administration has announced a program to divert large quantities to the manufacture of sauerkraut, supplies of which are at relatively low levels.

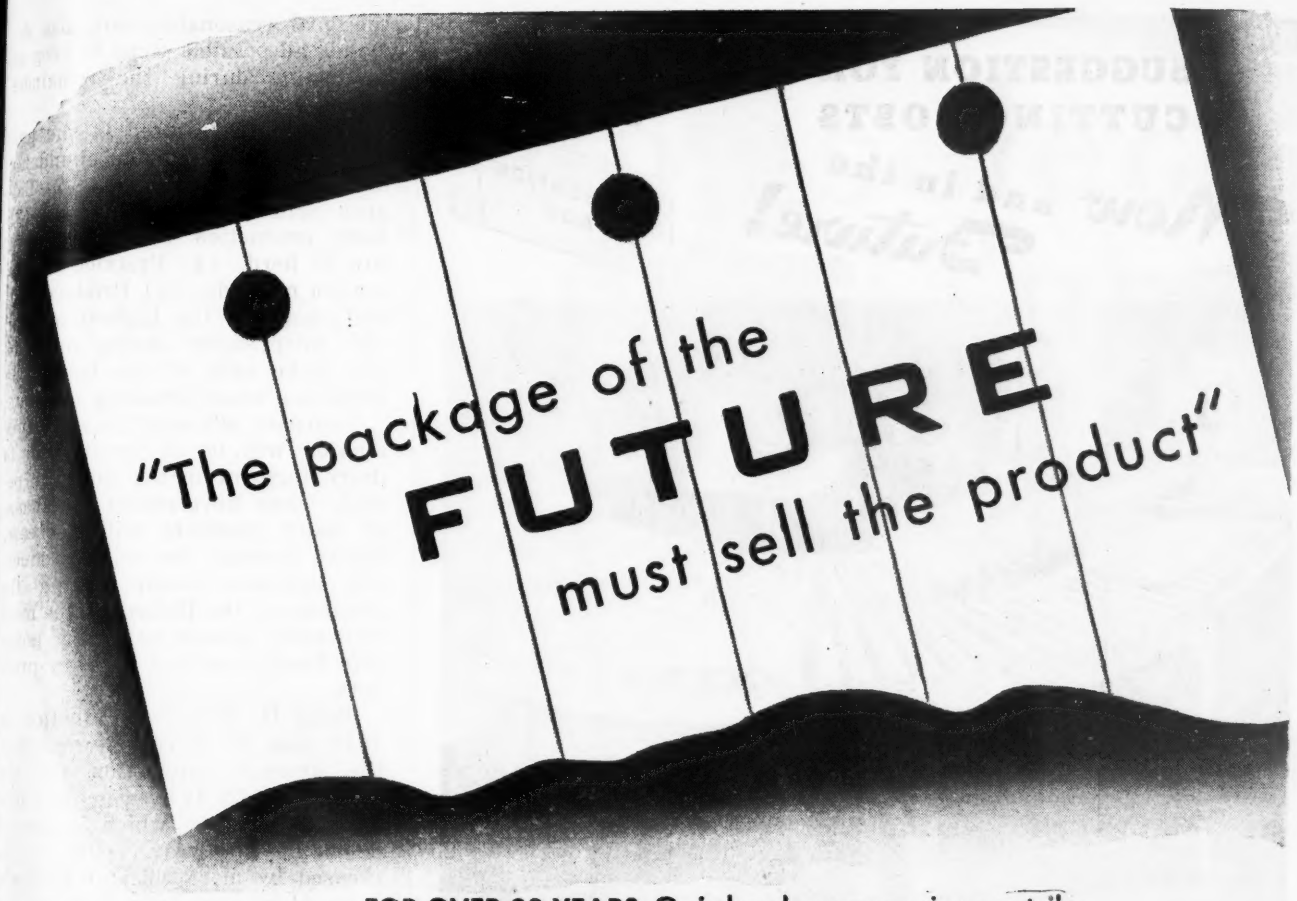
Under the program, WFA will defray the cost of transportation, up to $23.00 per ton, on all cabbage purchased in seven producing States: Florida and Texas, where production is heaviest, and Louisiana, Mississippi, Alabama, Georgia and South Carolina. The payments are necessary to enable kraut packers to pay growers a minimum of $15 per ton for cabbage, transport it to distant packing plants, and pack it for sale at existing ceiling prices. The program will enable packers to handle up to 35,000 tons of cabbage during the period.

Normally, winter-grown cabbage is not used widely in the packing of kraut. This year, however, the indicated total production is some 421,500 tons, compared with the ten-year (1934-43) average of 270,000 tons. Kraut packers, therefore, are being urged to use as much of the supply as possible to conserve food and meet the civilian demand for kraut.

Milk Production Goal Aided by New Program

A NEW nation-wide program to meet the wartime need for more milk is under way in each of the 48 states. Sponsored by the Department of Agriculture, the War Food Administration and State Extension Services in cooperation with the Dairy Industry Committee, the 1945 program will help dairy farmers to secure more production with available labor.

WFA and the department have set a 1945 goal of 120,582,000,000 lb. of milk. Milk production so far this year is on a level that makes



FOR OVER 80 YEARS, Gair has been a major contributor to the art of packaging. Many of the great industries of America and the world have turned to Gair to solve their packaging problems. Many an obscure product has achieved international distribution due to the ingenious packaging ideas of Gair — from the cracker barrel and hoop skirt era to frozen foods. The principles of packaging that are meeting with rigid war-time standards will be utilized in packaging everything from pencils to plow shares. Send your present and postwar packaging problems to Gair.

Appealing, appetizing designs will sell the product. This Sunshine Fancy ASSORTMENT is printed in full color right on Gair Patent coated paper board. Another famous Gair design and product. Write for Printers' Ink article by Egmont Arens industrial designer in which this Package appears.

SAVE GAIR WASTE PAPER

WRITE FOR BOOKLET "FASHIONS IN CARTONS"

ROBERT GAIR COMPANY, INC., NEW YORK • GAIR COMPANY CANADA LIMITED, TORONTO

Folding Cartons • Box Boards • Fibre and Corrugated Shipping Containers

Look Into Everything ROLLER CONVEYORS Can Do . . . Ask STANDARD CONVEYOR

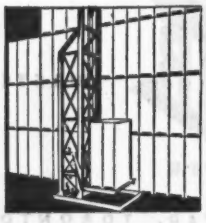
THE steps you take now — the investment in equipment that you may make to cut handling costs will not only pay dividends immediately but can be expected to yield equal or even greater returns in postwar days to come, when handling and other unproductive costs will be under the closest scrutiny.

For example, roller conveyors installed now will be useful in many ways no matter what you may be making or handling when peacetime is here. Roller conveyors are unequalled in low first cost, flexibility and minimum operating expense. They handle a wide range of commodities —parts, packages, units, cartons, cans, bottles, barrels, bundles, drums, boxes. They are available in light, average, or heavy-duty types for either portable or stationary use — in a wide variety of sizes, styles and lengths. Roller conveyors are built in their entirety by Standard, including the vital bearings which are manufactured to the highest standards.

Besides roller, Standard builds belt, chain, slat, and push-bar conveyors, also spiral chutes, tiering and lifting machines, portable pilers, and pneumatic tube systems.

On any conveyor requirement Standard Conveyor is equipped by experience and facilities to recommend and furnish the right type of equipment.

STANDARD CONVEYOR CO.
General Offices: North St. Paul, Minn.
Sales and Service in Principal Cities


TIERING AND LIFTING MACHINES

PORTABLE PILERS

SPIRAL CHUTES

PNEUMATIC TUBE SYSTEMS

the goal reasonable, but also demands all possible steps to keep up production during the remainder of the year.

The points featured in the program are: (1) Grow an abundance of high quality roughage. (2) Balance herd with feed supply. (3) Keep production records on each cow in herd. (4) Practice disease control methods. (5) Produce milk and cream of the highest quality. (6) Adopt labor saving methods. (7) Take care of the land. (8) Develop a sound breeding program.

Increased efficiency in milk production will be of great help to dairy farmers in the postwar period, when government purchases of dairy products will decrease. While demand for milk products will continue strong during the changeover, the United States must ultimately absorb milk now going into Lend-Lease and military products.

Total U. S. milk production in 1944 was 12 percent larger than the average production for the years 1933-42. If average milk production per cow, which is around 4,603 lb. per year, could be increased by more efficient methods, it would increase dairy farmers' net returns from milk and put him on a stronger foundation for postwar.

Record Pea Planting

PROCESSORS of green peas are planning to plant or contract for 12 percent more acres in 1945 than were planted in 1944, according to the Bureau of Agricultural Economics. Should these plans be carried out, the acreage planted to green peas, for canning and freezing, will total 523,700 acres, compared with 468,790 acres in 1944. The previous record planting was 484,260 acres in 1943, and the average for the ten years, 1934 to 1943, was 359,200 acres.

Sugar Supply

THERE should be at least as much sugar for all purposes, in 1945, as there was in 1944, according to Joseph F. Abbott, president of the American Sugar Refining Co.

The smaller Cuban crop will be offset by the fact that no sugar will be used, this year, in the manufacture of invert molasses, Mr. Abbott pointed out, adding that the 1945 Puerto Rico crop will be approximtaely 200,000 tons more than in 1944. Hawaii probably will produce as much as last year and the new beet crop should show some increase.

To help you select the most efficient fans

Most plant operating men have definite ideas concerning fans and blowers. They want, first of all dependable equipment, second, efficient equipment, and third, accessible equipment, so that servicing and maintenance costs can be kept low.

Illustrated here are two new Buffalo Fans and two new Bulletins which give complete data covering them. Read the description below and see if you need these bulletins for your files. No obligation.

The NEW Type "B" Axial Flow Fan fully described in Bulletin 3533

was designed to fill the need for a duct-mounted fan for the light duty common to ventilating and air conditioning service, that is for static pressures from ¼" to 1½". Made in nine sizes, up to 48" diameter, in belted-drive and direct-drive models, with or without vanes, the new Type "B" line offers quiet, efficient, reliable performance at moderate cost.

NEW Pressure Blowers and Centrifugal Compressors described in Bulletin 3553

These new heavy duty blowers have a wide range of application—handling air for oil or gas furnaces, on high pressure installation in glass, steel and chemical plants, for scale and water blow-off problems, experimental work, etc. They are suitable for pressures up to 4# per square inch. Newly developed rotors give efficient, trouble-free operation. Alloy construction of all or part of each blower is practical.

For Bulletins, Write

Buffalo Forge Company

152 Mortimer Street — Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" "First For Fans"

fans for industry

INSECTICIDES THAT KILL QUICKLY!

West Insecticides possess an exceptionally high relative killing power when tested by standard recognized methods. That they prove economical when used as directed is being demonstrated by the thousands of users in all parts of the country with various problems who report that the quantity of West Insecticides required per cubic foot of room space is extremely low.

ADVANTAGES OF WEST INSECTICIDES

1. *Positive action on a wide variety of insects..*
2. *Stability: Will not deteriorate in storage*
3. *Uniformity: Manufactured by a controlled chemical process.*
4. *Clarity, Non-Corrosive and Non-Staining Properties.*
5. *Non-Injurious: When used as directed as an insecticidal agent, these insecticides are known to have no health hazard.*

SEND FOR FREE BOOKLET

WEST DISINFECTING Company

42-16 WEST ST • LONG ISLAND CITY 1 • N. Y. • DEPT F

PROCESSING

Specify Sulphiting in Dehydrating Potatoes

The Quartermaster Corps decrees that, after July 1, potatoes dehydrated for the Army will have to be sulphited. The new ruling is made in order to bring about an improvement in color, general qualities and storage of both white and sweet potatoes.

Today all cabbage and carrots delivered on quartermaster contracts must be sulphited to dehydration. As a test procedure, a substantial quantity of white and sweet potatoes has been sulphited under special permission from the subsistence division, Quartermaster Corps.

Officials explained that dehydrators are being instructed in best methods of sulphiting potatoes. The permissible sulphite concentrations in potatoes are materially lower than in either cabbage or carrots. Permitted concentrations at this time are: for cabbage, 750 to 1,500 parts per million in the dehydrated product; for carrots, 500 to 1,000 parts per million; and for potatoes and sweet potatoes, 200 to 500 parts per million.

Sulphiting may be accomplished by either the gravity method at room temperature or the pressure method in which hot solutions are used. Treatment for potatoes is applied generally as the product leaves the blancher and before it is distributed on the trays.

Packaging Conference

Climaxing its most active season, the New York Section of the Institute of Food Technologists will hold a special packaging conference on the afternoon of May 3, followed by a dinner and a round-table discussion of the activities of the Institute. At the packaging session there will be talks on new developments in container materials, including tin, glass, fiberboard, paper and plastics.

SCHEDULE OF EVENTS

APRIL

18–20—National Independent Meat Packers Association, annual meeting, Morrison Hotel, Chicago.

Officially Canceled

9–10—Associated Retail Bakers of America, Chicago.

12–13—Wisconsin Dairy Manufacturers, Madison.

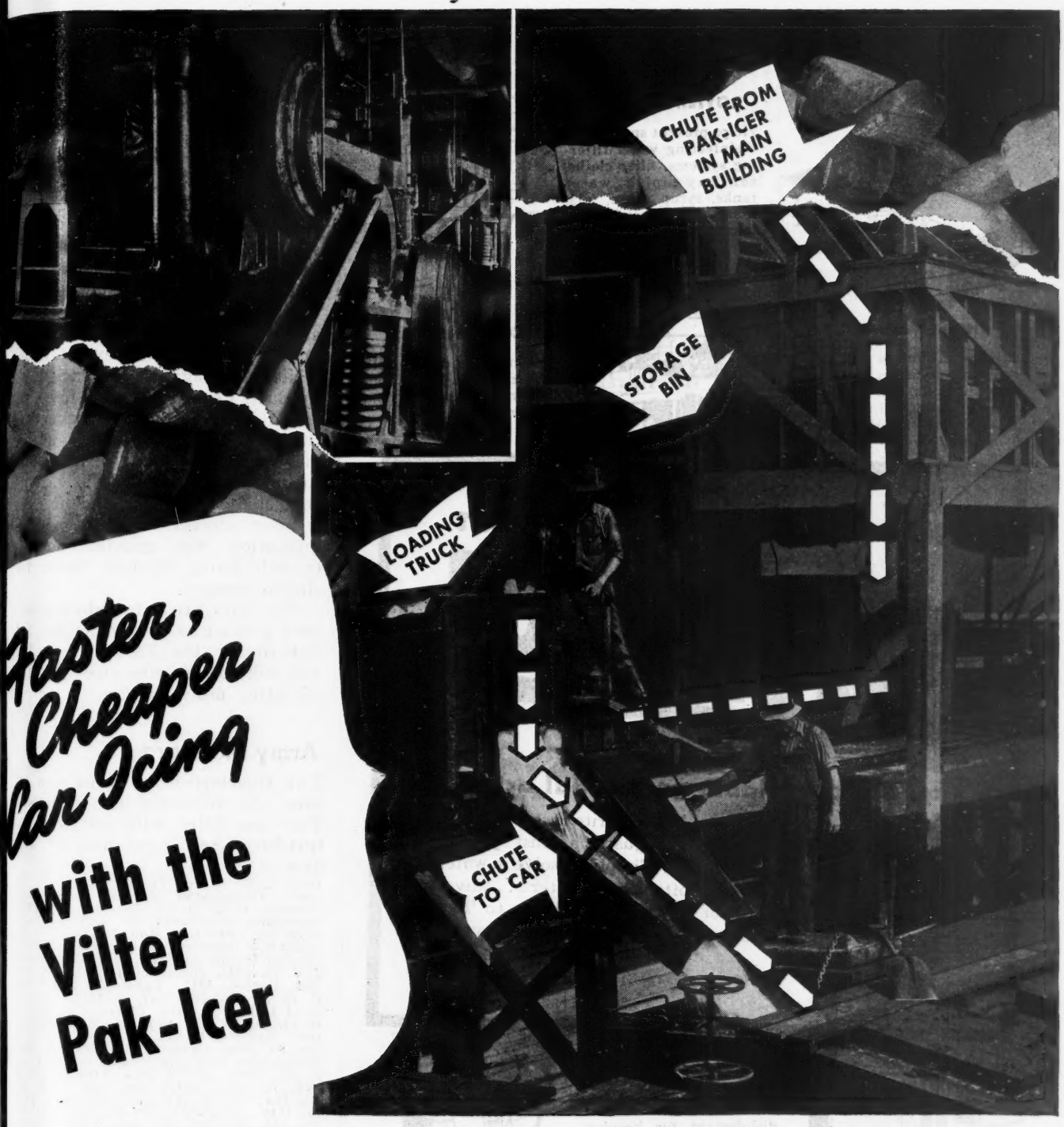
17–20—Packaging Institute, New York.

MAY

29–31—Wholesale Grocers Association, annual meeting, Stevens Hotel, Chicago.

Officially Canceled

9–11—American Oil Chemists Society, New Orleans.



Faster, Cheaper Car Icing with the Vilter Pak-Icer

The Vilter Pak-Icer is not merely a piece of equipment. It makes possible a *new, modern system of manufacturing, storing and handling ice for refrigerator cars* — reducing costs to a level approaching $1.00 a ton . . . providing a ready supply of ice exactly adjusted to your needs . . . with fast, smooth handling that saves manpower, gets your shipments rolling.

The amazing Vilter Pak-Icer turns out Pak-Ice briquettes — hard, cold, glistening chunks of ice — every piece alike — in less than twenty minutes after starting the equipment. Their scientific ovoid shape permits close packing, but minimizes contact, producing lower temperatures faster.

Results make older methods seem antiquated and extravagant. The machinery occupies about one-tenth of the space required for ordinary can ice plants. Operation is *entirely automatic.* You can chute the briquettes by gravity. Labor cost savings alone justify your serious consideration of Pak-Ice.

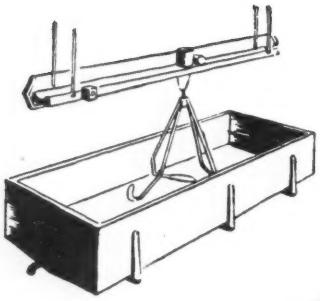
Vilter engineering service is available to design your complete system. Now is not too soon to get your own installation planned. Ask for bulletin 50. Address the nearest Vilter branch office, distributor, or: *The Vilter Manufacturing Co., Department C-12, Milwaukee 7, Wisconsin.*

Branch Offices and Distributors in Principal Cities

Vilter

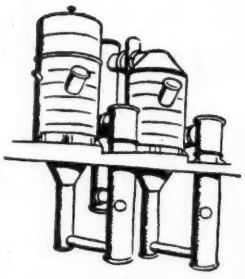
Air Conditioning • Refrigeration

P-1



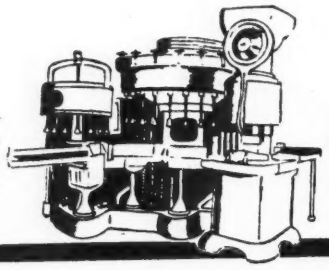
BOTTLING PLANTS

Helps prevent spoilage by disinfecting water-filtering systems, filter cloths, sanitary piping, water tanks, syrup tanks, jars, utensils, and special equipment. Easy to use.



CHEESE PLANTS

Diversol disinfects equipment that comes in contact with the milk and cheese. Helps prevent off-flavors, gassiness, and spoilage. Economical to use.



CONDENSERIES

When you disinfect with Diversol, you aid in controlling difficulties from heat-resisting bacteria.

FOR ALL FOOD PLANT EQUIPMENT

DIVERSOL

quick dependable germicidal action

A quick acting crystal sodium hypochlorite that helps control bacteria, mold, and yeast . . . guards against spoilage . . . helps protect taste and flavor. Simply dissolve in water and use as a rinse or spray. Softens hard water . . . leaves no film or scale. Write for descriptive bulletin to THE DIVERSEY CORPORATION, 53 West Jackson Boulevard, Chicago 4, Illinois.

BAKERIES

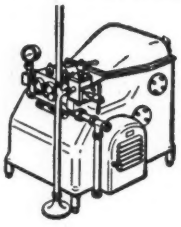
Diversol helps control mold in Proof Boxes, Overhead Proofers and Fermentation Rooms, Bread Slicers, Wrapping Machines, Racks, Boxes, Trucks, and Baskets.

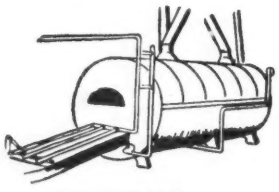
EGG HANDLING PLANTS

Diversol is a convenient disinfectant for keeping egg breaking and handling equipment in a sanitary condition. Easy to use.

ICE CREAM PLANTS

Use Diversol to disinfect Homogenizers, Ice Cream Freezers, and other equipment. Always dependable.





CANNERIES

Unless properly disinfected, canning equipment may be the source of spoilage. Diversol helps avoid this source of trouble.

Need help? Just call a

DIVERSEY D-MAN

SPECIALIST IN FOOD PLANT SANITATION

F&DA Halts Shipment Of Filthy Products

GREATER activity is to be noted in the operations of the Food & Drug Administration against processors operating filthy plants or using filthy raw material. The F&DA slogan, "Food has to be clean," is being backed up vigorously.

Two recent actions show how the wind is blowing and may be taken as indications of what the food industry in general may expect. Legal action taken against Hygrade Food Products Co., Manchester, Iowa, resulted in an injunction preventing that firm from shipping cheese made from filthy milk in interstate commerce. The action was heavily contested by the defendant, but without success. An uncontested injunction was granted against Odebolt Dairy, Odebolt, Iowa, for similar reasons.

The dairy products industry and food processors generally are warned, by the F&DA, that the war will no longer be an excuse for operating filthy plants.

Army Standards

THE Quartermaster Corps has issued the following specifications. They are listed with the Chicago Quartermaster Depot number and date of issue.

Beef Liver, C. Q. D. No. 349, Jan. 31, 1945. Dehydrated Noodle Soup with Chicken, C. Q. D. No. 352, Jan. 24, 1945. Operating Standards for Egg Storage, Breaking, Freezing and Drying Plants, Technical Bulletin No. 2A, Dec. 12, 1944. Canned Vienna Sausage, C. Q. D. No. 46C, Jan. 20, 1945, superseding C. Q. D. No. 46B, Dec. 4, 1942. Vegetable Salad Oil, C. Q. D. No. 327, Nov. 9, 1944, Amendment 1, Jan. 29, 1945. Sweet, Dehydrated Pickle Relish, C. Q. D. No. 353, Feb. 2, 1945. Smoked Bacon, C. Q. D. No. 33E, Oct. 29, 1944, Amendment 1, Feb. 2, 1945. Whole, Dry Milk and Nonfat Solids, C. Q. D. No. 166A, Apr. 8, 1944, Amendment 2, Feb. 10, 1945. Salad Dressing, C. Q. D. No. 45A, Oct. 18, 1944, Amendment 1, Feb. 13, 1945. Shortening Products, C. Q. D. No. 83A, Jan. 22, 1945, Superseding C. Q. D. No. 83, Oct. 14, 1942, and to be used in lieu of Federal Specification EE-S-321. Meat and Noodles, C. Q. D. No. 199A, Feb. 20, 1945, superseding C. Q. D. No. 199, Aug. 14, 1944. Whole, Powdered Egg for Civilian Feeding, C. Q. D. No. 355, Feb. 24, 1945. Boned Canned Chicken or Turkey, C. Q. D. No. 34C, Feb. 24, 1945, superseding C. Q. D. No. 34B, Mar. 31, 1944. Prepared Prunes in Heavy Sirup, C. Q. D. No. 356, Jan. 20, 1945.

Standard Delayed

SCARCITY of chocolate with which to make various food products caused War Food Administration to urge postponement of the effective date for the new definitions and standards of identity for cacao products. The argument presented was persuasive and Food and Drug Administration has announced that the effective date is changed from April 1 to October 1.

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Extra care in production control assures uniformity and quality in all classes of Globe steel tubes. Unvarying quality is safeguarded and production methods and materials exactly controlled by one of the largest and complete chemical and physical laboratories of its kind, concentrating on tubing characteristics and problems.

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GLOBE TUBES

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- ★ Mechanical Tubing
- ★ Gloweld Welded Stainless Steel Tubes
- ★ Globeiron High Purity Iron Seamless Tubes

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Will Not Crack or Peel

WATER-PROOF, ALKALI-PROOF, STAIN-PROOF, ACID-RESISTANT, OIL-RESISTANT

NO LAUNDERING
Save their cost over and over again!

TOPMOST PROTECTION
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
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YELLOW TERSON	ALL WHITE
27 x 36..$10.00 per doz.	27 x 36...$6.88 per doz.
30 x 36.. 11.25 per doz.	36 x 36.. 7.65 per doz.
36 x 40.. 15.00 per doz.	36 x 40.. 9.35 per doz.
36 x 44.. 18.50 per doz.	36 x 44.. 10.18 per doz.
Full Length Sleeves $10.25 per dozen pair	Full Length Sleeves $7.15 per dozen pair
Leggings, Hip Length $20.00 per dozen pair	
BLACK NEOPRENE	**OLIVE GREEN**
27 x 36..$12.90 per doz.	27 x 36.. $6.27 per doz.
30 x 30.. 14.00 per doz.	30 x 36.. 6.71 per doz.
36 x 40.. 18.33 per doz.	36 x 40.. 8.35 per doz.
36 x 44.. 20.50 per doz.	36 x 44.. 9.24 per doz.
Full Length Sleeves $12.90 per dozen pair	Full Length Sleeves $6.60 per doen pair
Leggings, Hip Length $23.50 per dozen pair	

All Prices F.O.B. Chicago. Furnish best priority. Minimum order 1 dozen.

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Free Sample Swatch on Request

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

HONEST UNCLE!—Uncle Sam no longer is going to violate his own regulations as to the purity, quality and labeling of food. This means that when government-owned foods must be sold for any reason they will be labeled and controlled as to quality in conformity with the Food and Drug Law. This fortunate agreement between Commodity Credit Corp., which formerly sold goods without regard to this law, and the Food and Drug Administration eliminates one form of very unfair competition and again gives highly desirable support to "honesty and fair dealing in the interest of the public."

TOO MUCH EXPORT—Washington awoke to the seriousness of excessive exports of foods about the middle of March. It then became evident to high officials, as it had been to the food industries for some time, that the American public was going to be very short of some very essential foods if reasonable controls were not placed on exports. Naming of a high-official committee to insure proper weighing of domestic needs, military requirements and essential relief was only a first step. It remains to be seen how heavily the political pressures will count when actual application of rules is attempted through the rest of the year. There is little which the industries can do except to shout their protests so that they'll be heard on Capitol Hill if it appears that the distribution is continuing to be unfair to the American people.

FOOD DEFERMENTS—Deferring of essential workers for the food industries is now a task of War Food Administration. Even so, the industries can expect very little protection against the taking of even skilled and seemingly "essential" workers under 30 years of age. Local draft boards are under such pressure to fill their quotas with young men that only an extremely small percentage of the age group from 18 to 29 can be held longer out of uniform.

LOWER TARIFFS—A definite program to secure further cut in tariff duties has been undertaken by the Administration. One of the proposals being first used as a means to that end is the suggestion that the President be allowed to cut tariffs by more than 50 percent through international trade agreements. It is not yet clear what method will be finally selected by the administration. Still less evident is the attitude of Congress, which must provide legislative authority. But there is little doubt that international peace arrangements are going to be used as a basis for carrying much further the Administration program for cutting back on import duties. Domestic enterprise cannot count on much, if any, tariff protection when peace comes if the program goes as now planned.

AID FROM ICC—Egg losses in transport have been unwarrantably large recently. A major cause has been improper packaging. This has often resulted from the reuse of defective cases and packaging material which in normal times would probably have been thrown away. Scarcity has resulted in the attitude of "taking a chance." Now the Interstate Commerce Commission places a responsibility on railroad carriers to see that eggs are packed properly before they are accepted for transport. Those who receive broken containers in excessive numbers can well demand that the carriers observe the ICC rules.

LESS BREAD WASTE—War Food Administration brags that its order covering the bakery sales practice of the country has greatly reduced wastage of unsold bread. It is claimed that

BASIC FLAVOR MATERIALS

Essential Oils **Whole and Ground Spices**

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OLEO RESIN PARSLEY SEED **OLEO RESIN CAPSICUM**

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the loss was decreased from 6.49 to 1.33 per cent. Some of these Washington officials are unofficially asking whether the bakers and the distributors are ever going back to the old consignment selling with its large loss from unsold food. This problem also has its features of importance for the technical director of baking operations. If he can slow down staling he can reduce loss on material unsold the first day. Thus the sales policies which encourage maximum use can develop without the costs that come from total loss of a large percentage of the sales.

FOOD BY AIR—Some of the government experts in the Bureau of Agricultural Economics are setting up a new index of the feasibility of moving foodstuffs as air cargo. They argue that commodities which can afford 10 cents per ton-mile for movement to market can so move economically. Thus they claim that at least one-third of the five billion ton-miles of fruit and vegetable traffic in the "winter garden" areas of the country can be considered as proper air cargo in the postwar period. The impact of such movement on competitive processed foods would be important.

FOOD SUBSIDIES—Industrial critics of the subsidy program of the government are urging in Washington that a tapering-off be started. The argument is that a very large part of the success of the government in holding down the cost of living with respect to food is accomplished by hiding the true costs behind a combination of subsidy and OPA price ceilings. The critics fear that manufacturers will either be caught between rising costs and frozen price ceilings with the ending of subsidies, or that they will be subject to bitter political attack for allowing prices to rise abruptly when ceilings are removed. The occasion for increasing interest in this subject comes from legislation pending in Congress to increase the funds of Commodity Credit Corp. from 3 billion to 5 billion. Food technologists in the factories can't do much about this, except perhaps to worry a bit on the public relations policies involved.

BABY FOOD VITAMINS—Official Washington now recognizes three aspects of the vitamin problem in baby food. These vitamins may be preserved in the finished food by "proper" manufacturing methods. Vitamins removed during manufacture may be restored by additions of chemical material. Or foods of nominal vitamin content may be fortified by extra added vitamin. There seems to be a tendency to regard preservation as better than restoration, and restoration as more generally desirable than fortification. Any plans for addition of vitamins to baby foods must be very carefully steered so as not to run afoul of official prejudice.

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better health

Gone are the days when the corner grocer weighed up a product, wrapped it and shoved it across the counter. The modern grocer sells *better health* . . . the extra nutritional values in modern foods.

That is why we recommend that you consider fortification of your products with Monsanto Mineral Supplements. By thus adding essential iron, calcium and phosphorus you give your retailers *something to sell.*

When you use Monsanto Mineral Supplements you are sure of exceptional purity. Monsanto derives its phosphoric acid and food-grade phosphates, from which the supplements are made, from Monsanto-refined phosphorus of better than 99.9 per cent purity. Monsanto is America's largest producer of elemental phosphorus.

Because of its leadership in the production of phosphorus and its derivatives, many manufacturers look upon Monsanto as headquarters for these products. Monsanto can offer you valuable technical advice. For information and samples of Monsanto Mineral Supplements, please contact the nearest district office or write: MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second St., St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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Increases refrigeration capacity from existing compressors — saves power—saves maintenance trouble and attention—increases plant production and earnings. With the "NO FROST" Method you always have full capacity with never any refrigeration loss from frosted coils.

Write for Bulletins 83 and 95.

NIAGARA Duo-Pass AERO CONDENSER

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Write for Bulletin 91

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NIAGARA

AIR ENGINEERING EQUIPMENT

INDICATORS

Production

Meat produced for interstate commerce was 24 percent less in February than in the previous month and 31 percent below February last year, American Meat Institute reports. Compared to January, the February production decreases were: pork, 38 percent; beef, 7 percent; veal, 36 percent; lamb, 18 percent; and lard, 37 percent.

Evaporated milk production of 252,000,000 lb. in January was the highest for the month since 1942, being 31 percent above January, 1944, and 29 percent above the five-year average.

Creamery butter production of 98,455,000 lb. in January was the smallest for the month since 1927, about 5 percent less than in January, 1944, and 18 percent less than the ten-year average.

American cheese output totaled 51,000,000 lb. in January, up 19.1 percent above the same month a year ago. The increase for all types of cheese was 10.7 percent, the output being 67,820,000 lb.

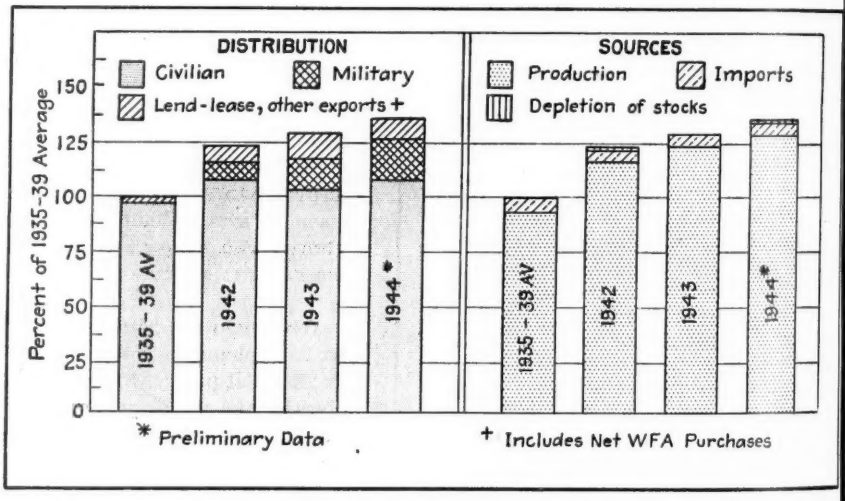
Flour milled in February amounted to 14,221,672 sacks, representing 73 per cent of the total U. S. production, according to the *Northwestern Miller*. This is down slightly from the 14,260,324 sack output of a year earlier.

Green beans canned last year totaled 14,818,392 cases, much less than the 1943 pack of 18,716,546 cases, according to National Canners Association.

The wax bean pack in 1944 amounted to 1,478,912 cases, appreciably less than the 1943 total of 2,150,062 cases, National Canners Association reports.

Materials

Sugar imports from offshore areas increased substantially during the first two months of the year, 863,938 short tons coming in as compared with 648,277 tons for the same period of last year. Despite this improvement, the sugar supply is lower than



Total disappearance of food produced in, or imported into, the U. S. was 35 percent higher in 1944 than in 1935-39. Although nearly all this increase in disappearance was made possible by large production, a small part of it came from a marked depletion of commercial stocks. These stocks, which had become quite large by the end of 1941, were reduced last year below the 1935-39 average. About 21 percent of the 1944 food disappearance consisted of takings by the armed forces, Lend-Lease, exports and shipments. The other 79 percent was taken by civilians. Chart prepared from data supplied by the Bureau of Agricultural Economics.

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DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
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CONSTRUCTION NEWS

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1945 (thousands)
Bakery	...	...	$ 70
Beverages	...	$ 80	80
Canning and Preserving	$ 45	140	840
Cold Storage	495	138	757
Confectionery	...	...	150
Grain Mill Products	240	171	651
Ice, Manufactured	...	92	230
Meats and Meat Products	...	40	182
Milk Products	80	520	835
Miscellaneous	218	2,290	4,215
*Complete 1945 total	$1,078	$3,471	$8,010*

a year ago. On January 1, the supply was nearly half a million tons less than a year earlier.

Milk production on farms in January was estimated at 8,900,000,000 lb., 3 percent above January last year and the highest of record for that month. This was the fourth month of record milk production.

In Storage

Meat in cold storage on March 1 was at the lowest level on record, being 19,000,000 lb. less than the previous all-time low in 1936. The small total holdings were the result of the small amount of pork on hand—less than half as much as a year ago and about 81,000,000 lb. less than the previous record low. Stocks of lard and rendered pork fat were only one-fifth those of last March. Stocks of sausage, however, were up 22 percent over the previous month, and beef stocks were 15 percent higher than they were a month ago.

Food products which experienced a heavy out of storage movement in February include lard, pork fat, fish, pears, apples, butter, frozen eggs, poultry, pork and frozen vegetables. Total food holdings in cold storage declined 12 to 15 percent during the month. (Freezer holdings were off 12 percent; cooler holdings, 15 percent.) These changes reflected declining food production and heavy wartime demand.

Indexes

Business activity index of *Business Week* stood at 232.5 for the week ended March 10, up from 227.6 a month earlier but below the 238.0 level a year ago.

Wholesale price index of foods, compiled by Irving Fisher, was 121.1 on March 16, compared with 122.8 a month earlier and 120.6 a year ago.

Cost of living index of National Industrial Conference Board for February was 105.5, against the January index of 105.7. A year ago the figure was 103.5.

To
EXECUTIVES • TECHNOLOGISTS
in the
FOOD INDUSTRIES
WITH PROBLEMS TO BE SOLVED

Have you a Food Equipment Development Problem which has been bothering you? If so, we believe that Artisan Metal Products Inc., an engineering and manufacturing firm, which has specialized for the past ten years in solving problems for both the Food and Chemical Process Industries, can be of assistance to you.

Artisan Engineers have a background and experience in Chemical and Mechanical Engineering which is of value to the Food Industry. They know how to get heat into, and out of, products quickly or slowly. Since heat flow, along with fluid flow, is the fundamental background for Heating Equipment of all types, evaporators, cooking, etc., Artisan's engineers can contribute materially in assisting your engineers by offering specialized experience in these important fields.

Most Food Processors who develop a new product or improve an "old stand-by" work out their ideas in the laboratory. Then the laboratory tries to assist the engineering department in developing the laboratory process to mass production. This is a slow phase in the development of any product and is the spot where Artisan engineers have helped many clients. *We believe we can help you, too.*

Artisan specializes in the design and manufacture of Pilot Plant Equipment for transforming the ideas of the laboratory to meet the problems of mass production. *Artisan is not too big to engineer a small piece of equipment carefully, to help your staff operate it, and to make changes in the equipment to meet changing requirements.*

If you believe Artisan Engineers can assist in solving your engineering and equipment problems, please write asking for an engineer to call.

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CORN OIL LECITHIN

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STABILIZER • ANTIOXIDANT EMULSIFIER (as agent)

STABILIZER FOR ALL EDIBLE ANIMAL AND VEGETABLE OILS AND FATS

VODOL, natural phosphatide, extract of corn oil perfected by our processing, reveals DEFINITE SUPERIORITIES over Lecithins from other sources: In ready solubility, freedom from lumping, neutrality as to odor and taste.

VODOL has established preference thru proof-tests by leading users for

1. Inhibiting flavor reversion of refined vegetable oils,
2. Incorporation in margarine,
3. Stabilization of lard (where VODOL is now extensively used),
4. Stabilization of shortening for prepared flours,
5. Stabilization of fish oil vitamin concentrates.

Outstanding Characteristics of VODOL...

- Instantly soluble at low temperatures. Requires no pre-heating, no pre-dissolving, no straining, no thinning by stirring, etc.
- Pours freely.
- Is most easily handled. Disperses readily in liquid, solid or semi-solid fats.
- Does not contribute any odor whatever to finished product. Does not affect taste nor color in the slightest.
- Your product when it contains VODOL, will not darken under heat like other lecithins.

Now, first time since the beginning of the use of Lecithins, a REAL advance is made in desired properties. These are all embodied in VODOL. In addition to qualities named, VODOL is an outstanding agent for reduction of interface and surface tension, and viscosity in such products as oleomargarine, chocolate, textile and other industrial emulsions, mineral oils and waxes, prepared flours, etc.

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VODOL ready for immediate use, is available in 500 lbs., 50 lbs., 25 lbs. drums. Smaller packages by special arrangement.

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Determine for yourself, by comparison, the reasons why VODOL excels all other lecithins. LIBERAL SAMPLES will be promptly sent FREE on your request. Fill out and mail Coupon (to right), NOW.

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Name of inquirer _____

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MEN • JOBS • COMPANIES

INDUSTRY

Bell Brand Foods, Ltd., newly organized, has purchased the Los Angeles Saratoga Chip and Pretzel Co. and the Bell Potato Chip and Pretzel Co. for $250,000. Announcement was made by C. Nigg, who is associated with Charles F. Fuller and James P. Hickey in the new enterprise.

Borden Co., New York, has bought Soy Bean Products Co., Chicago, makers of "Soyco." The product is made at the Bennett Creamery Co. plant in Ottawa, Kans.

Bowman Dairy Co., Chicago, has completed final plans for a merger with the Cleveland (Ohio) Ice Cream Co. David H. Schlegel, president of the latter company, will continue as its head under the new alignment.

California Fruit Growers Exchange is planning to spend $400,000 on construction of a new plant at Ontario, Calif., as soon as priorities can be obtained. The new plant is expected to have a capacity of 2,000 cars of single-strength orange juice annually.

Coca-Cola Bottling Co. will construct a new plant in Spokane at a cost of $500,000, as soon as materials and labor are available.

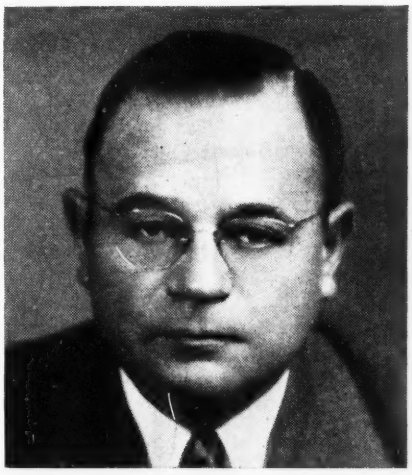
Di Giorgio Fruit Corp. has sold the capital stock of its wholly owned subsidiary, Del Vista Wine Co., Inc., Delano, Calif., to Alfred Hart, wholesale liquor and wine distributor in southern California, for about $10,000,000. Included in the transaction is a winery with 8,000,000 gal. capacity.

Glaser-Crandall Co., Chicago, has purchased Keokuk (Ill.) Canning Co. The Chicago company will assume operations at the latter plant after a brief shutdown for remodeling.

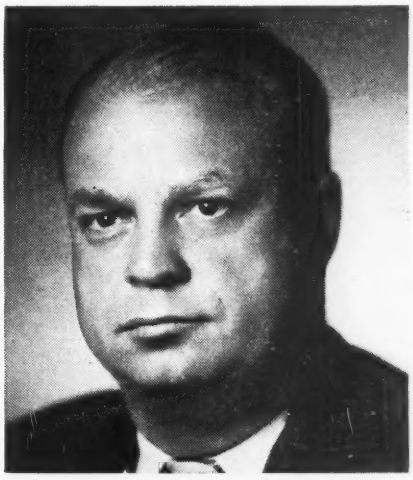
Lewis-Pacific Dairymen's Association, in the State of Washington, recently purchased the Chehalis plant of Borden Co., at a cost of $115,000, to eliminate duplicate trucking and effect other savings through single management.

McNamara Food Products, Inc., Detroit, has succeeded the dissolved Master Food Products Corp. The new company will continue the "Master Brand" of prepared mustard.

The Missouri Farmers Association, Springfield, Mo., has contracted for a $400,000 milk-drying plant at Cabool, Mo.



GEORGE E. CLAUSEN
Recently elected as president of the National Dehydrators Association, George E. Clausen is the managing partner of the C. B. Gentry Co., Los Angeles and Gilroy, Calif. He has been a director of the association since its organization.



L. W. VAN DOREN
Puccinelli Packing Co., Turlock, Calif., has just appointed L. W. Van Doren technical director and sales manager. He was formerly dehydration engineer and technologist for Basic Vegetable Products Co., with headquarters at Elmhurst, Ill.

Morrell & Co. has awarded a contract for a $150,000 addition to its Ottumwa plant, not at Cedar Rapids, as reported in this column last month.

Myer 1890 Bottling Co., Inc., New York, has announced its acquisition of Sunkist Drinks, Inc.

National Dairy Council officers for 1945 are as follows: President emeritus, M. D. Munn; president, Milton Hult; 1st vice-president, W. L. Cherry; 2nd vice-president, W. A. Wentworth; secretary, A. H. Lauterbach; treasurer, G. E. Wallis.

Polar Foods, Inc., Ashland, O., has been incorporated with $100,000 capital. The principals are J. H. Gongwer, R. W. Dumas and D. W. Dickerson.

C. H. Runciman Co., Lowell, Mich., was damaged by fire to the extent of $20,000 on Feb. 13. Other fires reported during the month were: Southern Packing Co. cannery, Mount Lake Park, Md., where the damage was estimated at $100,000 by President W. E. Lambie; and the Herbert M. Trafton olive oil plant near Lindsay, Calif., which suffered complete loss of its plant, equipment and stock valued at $100,000.

Swift and Co., Frankfort, Ind., will complete a seven-building soybean mill in that city in time to process the 1945 crop.

Charles Sucher Packing Co., Dayton, O., has been incorporated with $300,000 authorized capital. The principals are H. E. Wall, Jr., R. D. Kemper and J. B. Coolidge.

Western Canada Flour Mills Co., Ltd., Toronto, has changed its name to Purity Flour Mills, Ltd., and will add the word "Purity" to its brands. David I. Walker recently was named president of the firm.

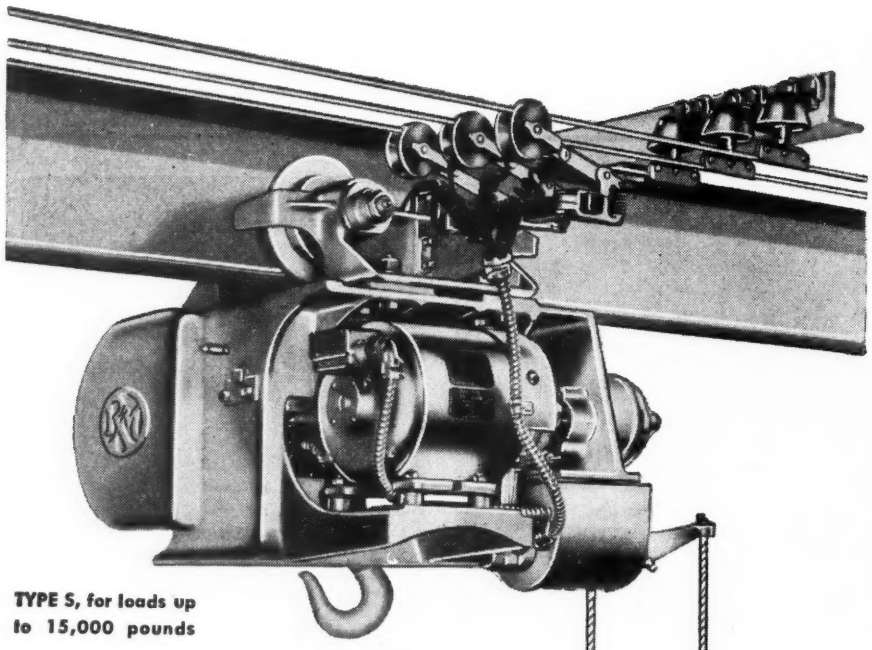
Homer J. Williamson, Inc., Indianapolis candy manufacturer, will move into new quarters in that city soon. Earl T. Williamson, president and production manager, announces that new equipment, including additional conveyors and high-speed wrapping machines, will be installed.

PERSONNEL

T. L. Aronson, former manager of Santa Clara Frosted Foods Co., now is production and general manager of the Bridgeford Co., San Diego frozen food producers. His successor at Santa Clara will be F. L. Kulper, formerly manager of Santa Clara Valley Fruit Exchange.

H. A. Benning, Ogden, Utah, was elected president of Amalgamated Sugar Co. recently, and M. S. Eccles, Washington, D. C., was named chairman of the board of directors, following the annual stockholders' meeting in Ogden. Other officers are R. H. Cottrell, vice-president, and J. R. Bachman, secretary-treasurer.

Joseph J. Boucher has been appointed manager of the Milwaukee branch of Russell-Miller Milling Co. He succeeds Ralph Strathey, who has been transferred to the firm's West Coast offices.



TYPE S, for loads up to 15,000 pounds

It's SPEED, you want!

With a 2 H.P. motor this R & M hoist lifts 1000 pounds at 50 feet per minute. That's *fast!* Or with a 3 H.P. motor it lifts one ton at 40 F.P.M. And that's fast, *too.* Robbins & Myers electric hoists waste no time. They save *minutes* that run into *real money.*

Heat-treated alloy steel gears and shafts, rigid, one-piece cast Aremite metal frame, anti-friction bearings throughout, oversize "no drift" brakes and dependable R & M high-torque motor make this *speedy* Type S hoist an ideal unit for heavy loads and continuous operation.

Don't tolerate *slow* equipment. *Fast,* low-headroom R & M hoists can serve your every need. There are *hundreds* of standard types and models. Ask for Bulletin 830.

Take It Up with R & M

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston.....74 Needham St.
Chicago.....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland...470 Rockefeller Bldg.
Dallas.....1100 Cadiz St.
Denver.....1420 16th St.
Detroit ... 7376 Grand River Ave.
Houston....3715 Harrisburg Blvd.
Jacksonville.....305 Bisbee Bldg.
Kansas City, Mo.....215 Pershing
Los Angeles .....2257 E. 15th St.
Meriden, Conn....401 Liberty St.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia....401 N. Broad St.
Pittsburgh....H. W. Oliver Bldg.
Providence.....44 Clifford St.
San Francisco, 116 New Mtgmry St.
Seattle.....216 Walker Bldg.
Syracuse...204 State Tower Bldg.
Montreal....Lyman Tube & Supply Co., Ltd.

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MOTORS • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878

F. G. Bowen, formerly with Thomas J. Lipton, Inc., now is associated with Alexander Gruff Sales Co., New York, in charge of the dehydrated food department.

Joseph R. Braden is the new president and general manager of Pratt-Low Preserving Co., Santa Clara, Calif., succeeding Frank F. Hanington.

C. C. Cadagan is now vice-president of Hawaiian Pineapple Co. at the Honolulu office, having formerly been an assistant vice-president at San Francisco.

G. R. Castle, vice-president of Swift Canadian Co., Ltd., has been named assistant general manager, with headquarters in Toronto.

Harry B. Conlon is the new president and treasurer of Cobb's Sunlit Bakery at Green Bay, Wis. He previously served as vice-president.

Hans Edel, formerly with Gehl's Guernsey Milk Farms, Inc., Milwaukee, has joined the engineering staff of Bowman Dairy Co., Chicago.

George M. Frauenheim has been elected president of George J. Meyer Malt and Grain Corp., Buffalo, succeeding Leo P. Meyer, resigned.

Irving Goldfeder has been promoted to production manager of Hunt Brothers Packing Co., West Coast food packers. He formerly was raw products buyer and was in charge of operations at the company's Hayward, Calif., plant.

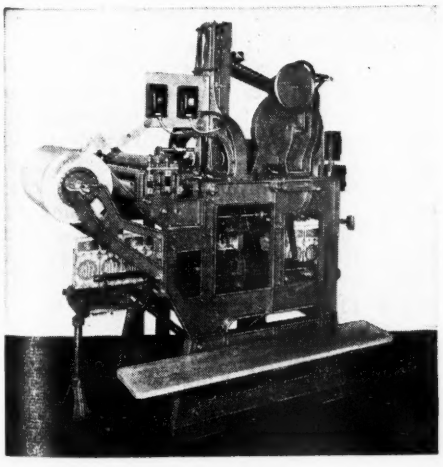
H. E. Hogsett, Greeley, Colo., has been elected president of the newly organized National Federation of Beet Growers, representing nine western cooperatives.

William R. Morris has retired as president of the Eastern Division of General Mills, Inc., after serving the company 45 years. He is succeeded by Harry C. Lautensack, vice-president of the division, who has been affiliated with General Mills for 35 years.

Delbert Mower and Carl Danielson have announced plans for the construction of a commercial dehydrating plant at Vacaville, Calif., as soon as priorities can be obtained. The plant will have a capacity of 1,000 dry tons a year. The dehydraters will be gas fired.

Stephen S. Nisbet, superintendent of the public school system in Fremont, Mich., for the past 22 years, has been appointed to the newly created post of personnel director for Gerber Products Co., Fremont. He will be in charge of employe relations and welfare, as well as of the public relations policy of the company.

Is Your Packaging Problem Similar To Any Of These?



LARGE LINING MACHINE — cuts paper from a roll, forms the bag liner, seals the seams (glue or heat) and inserts liner in carton.

If It Is — call on Pneumatic to make an analysis of your packaging production requirements. We shall be glad to submit recommendations based on a background of knowledge and experience accumulated over nearly fifty years.

There is good reason why Pneumatic machinery is being used to package the products illustrated and hundreds of others. The efficiency of Pneumatic Pre-War Packaging Equipment speaks for itself. Because of an alert and active Engineering Research Department, you can look for even greater performance records from Pneumatic Packaging Machinery in days to come.

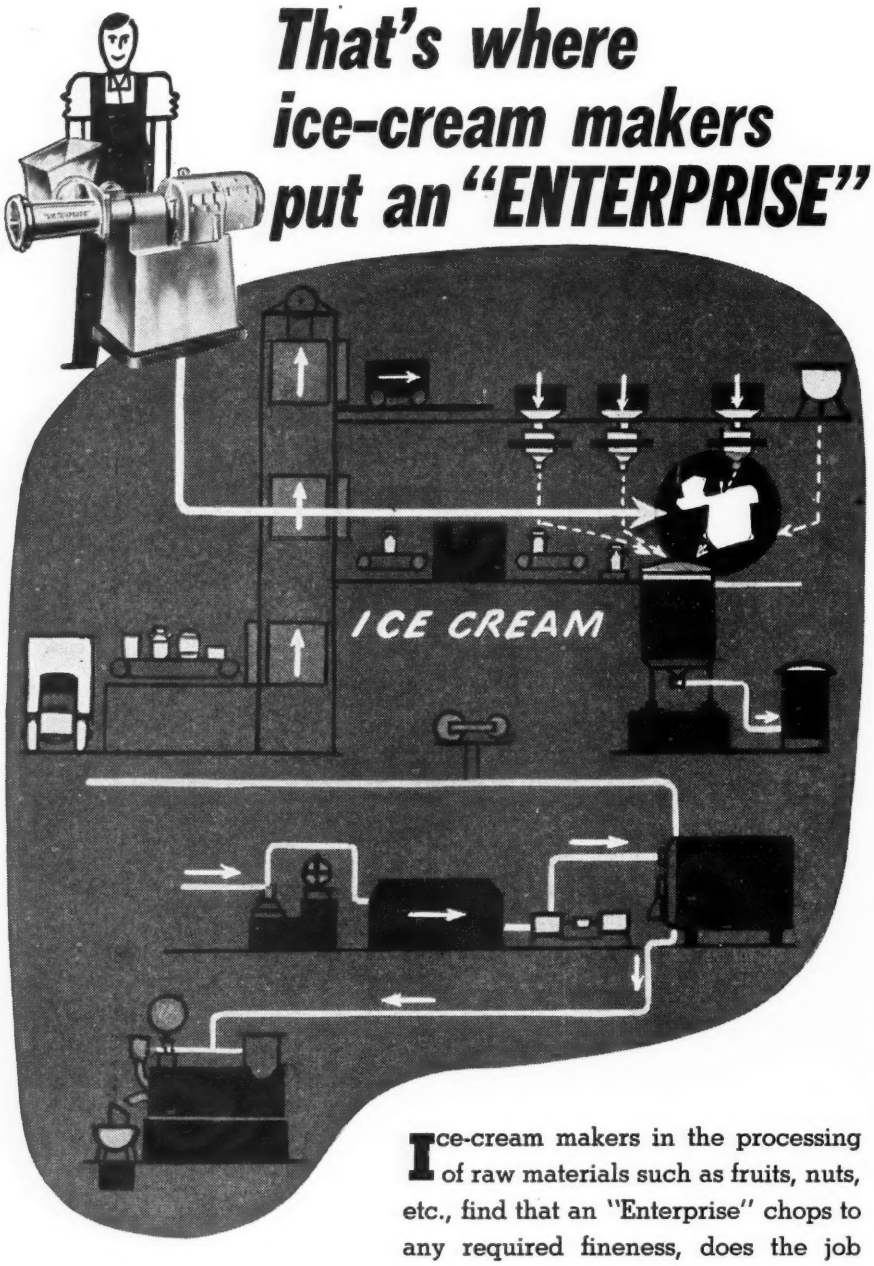
It will pay you to get the facts *now* about Pneumatic's "Lower Cost Per Container" packaging equipment for any packaging problem you may have.— Pneumatic Scale Corporation, Ltd., 91 Newport Ave., North Quincy 71, Massachusetts. Branch Offices: New York 6, Chicago 1, San Francisco 11, Los Angeles 13.

Complete Packaging Machinery Hook-Ups for: CARTON FEEDING, SEALING, TUCKING, LINING, WEIGHING, FILLING, AND WRAPPING.

PNEUMATIC

PACKAGING & BOTTLING MACHINERY

That's where ice-cream makers put an "ENTERPRISE"



Ice-cream makers in the processing of raw materials such as fruits, nuts, etc., find that an "Enterprise" chops to any required fineness, does the job with speed and economy.

Packers, bakers, canners, confectioners—all sorts of processors—are getting a better product at a lower cost, with the exclusive Enterprise System of Cutting. Razor-cutting, automatic operation, adaptability, dependability, advanced engineering—*they're* what make the difference.

What food do you reduce? If you'll outline your problem, our engineers will be glad to make suggestions.

The ENTERPRISE System of Cutting

It's exclusive! *It's superior!*

The ENTERPRISE MFG. CO. of PA.

PHILADELPHIA 33, PA.

79 YEARS' EXPERIENCE BEHIND THE MODERN "ENTERPRISE"

Dr. Robert M. Shaffner, who for two years has conducted research in dehydration under the direction of the Miner laboratories, has been made a member of the Libby-Blue Island laboratory staff as a chemical engineer. He will deal with problems relating to the capacity and utility of food processing equipment.

Dr. William W. Skinner, formerly chief of the Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, now is director of the National Technical Advisory Institute, Inc., Washington. Among its activities, the Institute includes advisory service in the production, processing, standardization and utilization of foods, beverages, insecticides, fungicides and biological preparations.

Thomas G. Tolman has been appointed production manager of Henry & Henry, Inc., Buffalo, manufacturers of bakers' supplies. Mr. Tolman has been engaged in research work in the food processing field for 15 years.

DEATHS

George W. Cobb, 75, retired general sales manager of American Can Co., Feb. 27, at Sebring, Fla.

Arthur W. Feeser, 72, president of A. W. Feeser & Co., Westminster, Md., at Hanover, Pa., recently.

J. S. Foster, 55, treasurer and director of Seminole Flavor Co., and president of the Double Cola Bottling Co., Chattanooga, March 4.

Isadore V. Gedney, 76, president of A. M. Gedney Co., Minneapolis pickle and vinegar manufacturer, recently, in Minneapolis.

Christian Heurich, Sr., 102, dean of American brewers and still active as head of Christian Heurich Brewing Co. at the time of his death, March 7, in Washington, D. C. Mr. Heurich was born in Germany, before the founding of the German Empire, and came to the United States in 1866. He founded the capital's only brewery in 1872 and continued to visit the plant daily until ten days before his death.

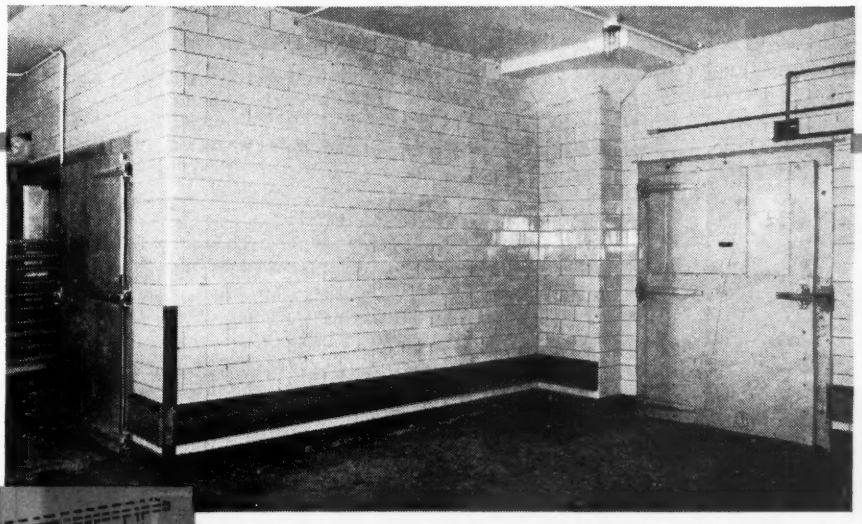
Edward M. King, 46, president of the Gaines Food Co., Inc., New York, a subsidiary of the General Foods Corp., March 15, Darien, Conn.

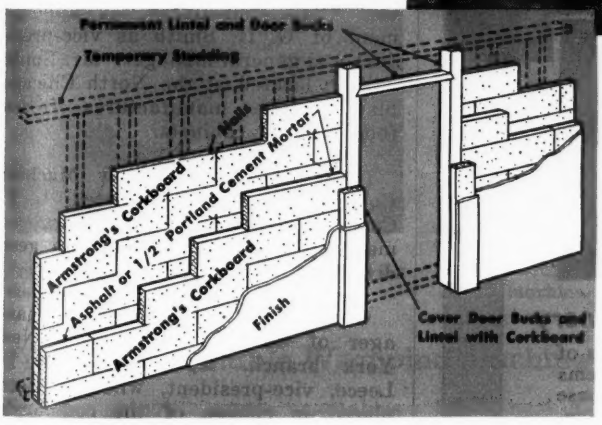
Henry S. McGowan, 78, pioneer in the Lower Columbia River's salmon packing industry, at McGowan, Wash., in January.

Thomas F. Miskell, 64, former eastern sales manager for Diamond Crystal Salt Co., in Buffalo, recently.

This cold room looks efficient ...AND IT IS!

See how low temperatures are safeguarded by using Armstrong's Corkboard Insulation behind the tile walls.





Above: View of the chill room of College Inn Food Products Co., Chicago, showing quick-freeze tunnel at left. Installation also includes anteroom and holding freezer.

Left: Drawing illustrates method of erecting solid cork partitions similar to those shown above.

ARMSTRONG'S INSULATIONS used in the cold room of the College Inn Food Products Co.

	Floors	Ceilings Corkboard	Walls Corkboard
Vestibule	6" Foamglas	4"	4"
35° Chill Room	6" Foamglas	4"	4"
0° Holding Freezer	6" Corkboard	6"	6"
—20° Freezer Tunnel	8" Corkboard	8"	6"

The insulated ceilings are coated with Armstrong's Asphalt Emulsion and finished with Armstrong's White Sealer and Armstrong's White Cold Storage Enamel.

MAXIMUM OPERATING ECONOMY—year after year—is assured for the new cold rooms recently built for the College Inn Food Products Co., Chicago. For the walls of these modern rooms—finished in glazed tile—are insulated with dependable, efficient Armstrong's Corkboard—as are the ceilings and the floors of two rooms. Foamglas* is used to insulate the floors of the other two rooms.

For years, Armstrong's Corkboard has been the standard low-temperature insulation because of its low thermal conductivity and high resistance to moisture. Foamglas, because it has high compressive strength, is ideal for insulating floors, and it is moistureproof and fireproof.

When you plan low-temperature facilities, take advantage of Armstrong's 40 years' insulation experience. Armstrong's complete Contract Service includes (1) practical engineering help, (2) dependable materials, and (3) installation by skilled mechanics. For full details of this triple service write today to Armstrong Cork Company, Building Materials Division, 4204 Concord Street, Lancaster, Pennsylvania.

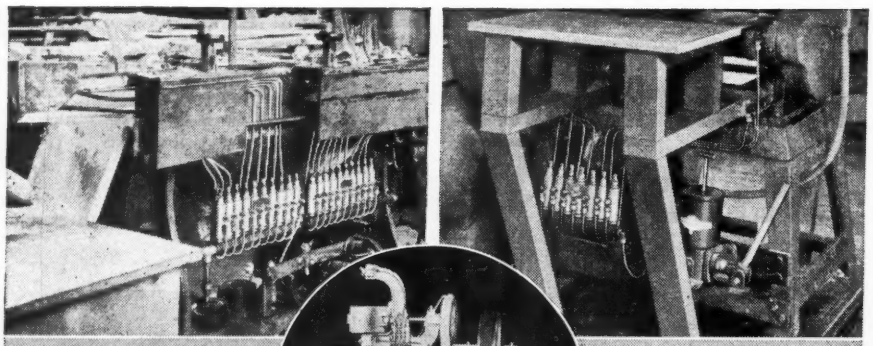
* Reg. U. S. Pat. Off.—Product Mfg. by Pittsburgh Corning Corp.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

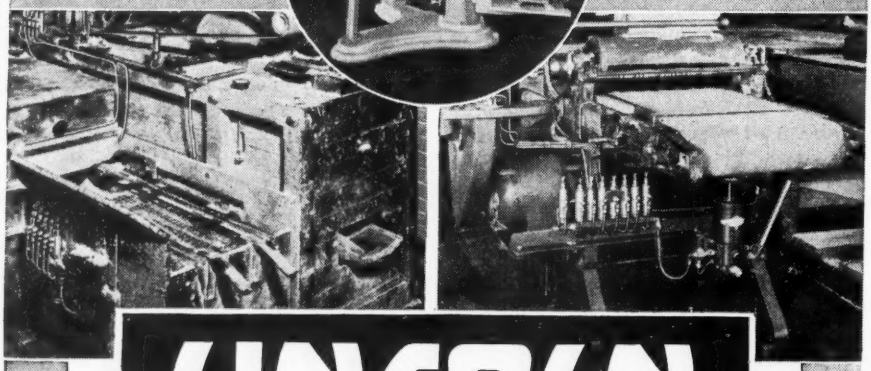
From 300° Below Zero

To 2600° Fahrenheit



Above—BAINBRIDGE CUT ROLL CENTER MACHINE
Center—SAVAGE AGITATING COOKER
Below—SIMPLEX STARCH BUCK

Above—SAVAGE SLAB SLICER
Below—RACINE CUTTING MACHINE

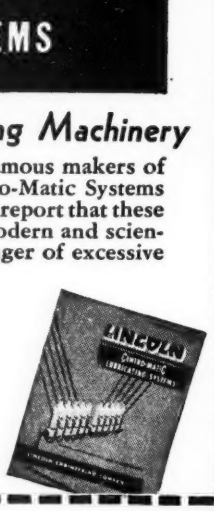


LINCOLN
CENTRO-MATIC
LUBRICATING SYSTEMS

For all types of Food Processing Machinery

The Mavrakos Candy Company, nationally famous makers of high-quality candies, installed Lincoln Centro-Matic Systems on all complex machinery in their plant. They report that these systems, in addition to providing the most modern and scientific method of lubrication, eliminate the danger of excessive lubrication since each injector can be adjusted individually so as to supply the bearing with the exact amount of lubricant needed.

Lincoln Centro-Matic Systems are flexible and can be installed on all types of food processing machinery. Hundreds of manufacturers have so equipped their entire plants, and savings pay for the installations in a short time. Mail the coupon below for bulletin and full information.



I WOULD LIKE TO HAVE FREE BULLETIN
On Lincoln Centro-Matic Lubricating Systems

Name _____
Title _____
Company _____
Address _____
City _____ *State* _____

FI B257

LINCOLN ENGINEERING COMPANY
Pioneer Builders of Engineered Lubricating Equipment
5701 NATURAL BRIDGE AVE., ST. LOUIS 20, MO., U. S. A.

Andrew E. Nelson, 66, former president of Adolf Gobel, Inc., Brooklyn, at his home in New Rochelle, N. Y., Feb. 10.

Walter Rick, 47, general manager of Eagle Baking Co., Chicago and Detroit, recently, in Detroit.

Warren H. Sapp, 60, Chicago plant manager for Armour & Co., March 4, in Chicago.

ASSOCIATED INDUSTRIES

American Products Co., Cincinnati, announces the election of E. F. Dinan as vice-president in charge of sales, and C. A. Branham as advertising and sales promotion manager.

Continental Can Co., New York, has appointed J. P. Morgan manager of jobbers' can sales, including coffee and food specialties.

Deepfreeze Division, Motor Products Corp., announces the appointment of G. H. Smith as vice-president and general manager. Mr. Smith will be located at the North Chicago plant, which manufactures frozen food storage cabinets.

Foote Bros. Gear and Machine Corp., Chicago, has elected L. F. Campbell vice-president in charge of manufacturing of the precision gear division.

Gilbert H. Gaus is the new manager of Gardner-Denver Co.'s New York branch. He succeeds G. V. Leece, vice-president, who has been placed in charge of the company's export division.

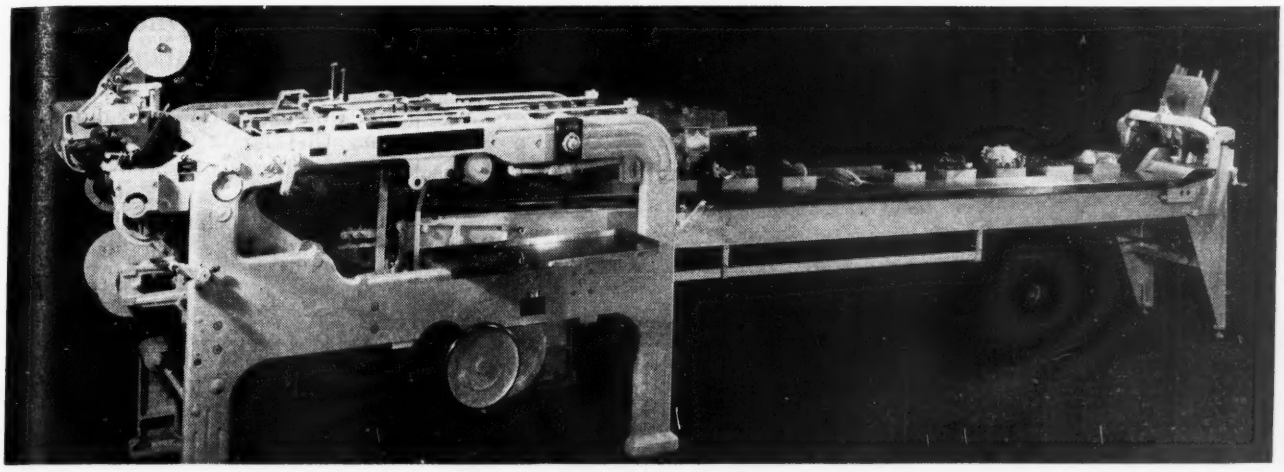
B. F. Goodrich Co. will construct a new research laboratory in Brecksville, Ohio.

Interstate Cotton Oil Refining Co., Sherman, Tex., has appointed E. M. Deck as manager of its newly created products service department.

Shell Oil Co., in cooperation with Shell Development and Shell Chemical divisions, announces the establishment of a $500,000 agricultural and experimental farm at Salida, Calif. It will consist of a laboratory, greenhouse and auxiliary units for testing and adapting petroleum chemicals for use as agricultural sprays, fertilizers and weed eradicants.

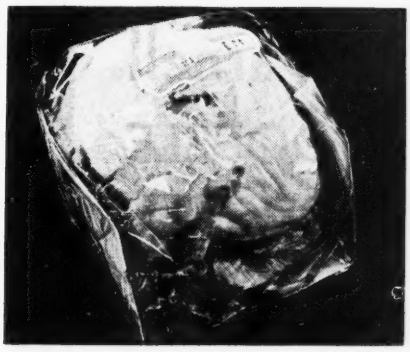
Shellmar Products Co., Mt. Vernon, Ohio, and Pasadena, Calif., has promoted F. P. Winslow to the position of general manager, responsible for manufacturing and sales in 11 western states. J. H. Gauss, sales manager of the central division, also will handle sales of the eastern division.

FOOD EQUIPMENT NEWS



Machine for wrapping and labeling fresh fruits and vegetables automatically.

Fruit wrapped, heat sealed and labeled by the machine.



Lettuce wrapped, heat sealed and labeled by the machine.

Fruit and Vegetable Wrapping Machine

FRESH FRUITS and vegetables may be automatically wrapped and labeled by a new machine manufactured by Oliver Machinery Co., Grand Rapids, Mich. Supplementing the natural coating of many fruits and vegetables, the moisture-proof heat-sealed cellophane wrapper applied by the machine greatly retards spoilage by preventing evaporation of the natural moisture. This preserves both the flavor and the weight of the product. The cellophane-wrapped heat-sealed package becomes its own "hydrator," when placed in the home refrigerator.

The machine will handle a variety of perishables in a wide range of sizes. One model takes packages from 3⅛ to 14¾ in. long, 2¾ to 8½ in. wide and ½ to 5¼ in. high. Other models are available for different size ranges.

The machine can be adjusted for package size in a minute or two. The simple turning of one handwheel adjusts the hot plates, the folders and the conveyor belt. The length of the cellophane can be adjusted while the machine is in motion.

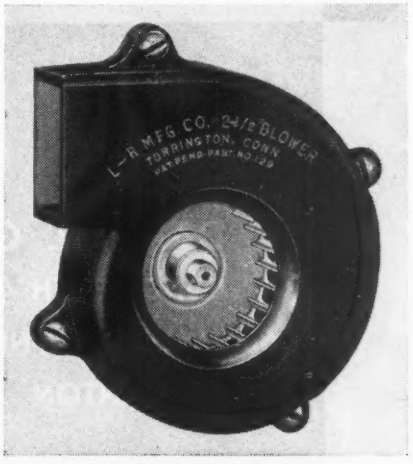
An automatic cardboard folder and feeder attachment is mounted on the end of the infeed conveyor. It folds and feeds U-boards, or flat cards. The article to be wrapped is placed directly on the cardboard support. The 12-ft. infeed conveyor has spacious tables to facilitate the assembly of produce and containers. This permits the use of several girls, if necessary, to keep the machine loaded.

The manufacturer states that one of the most interesting features is simplification of the labeling. By using rolls of partially preprinted thermoplastic labels, the price, weight and date, or code, are automatically printed on the label just before it is heat-sealed to the wrapper. As the printing device is easily accessible, changes of any or all label items are readily made.

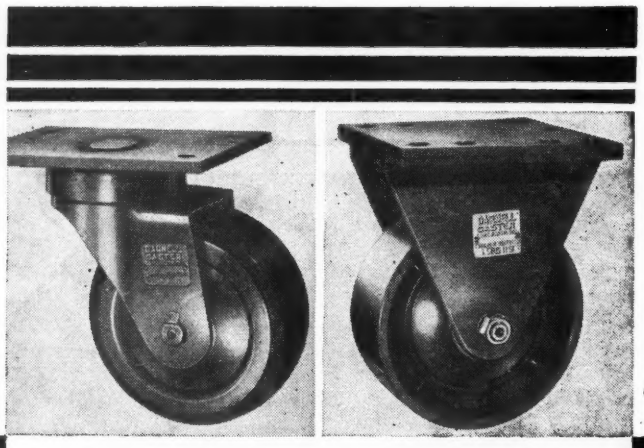
The rolls of thermoplastic labels are die-cut, attached end to end, and are printed in two or more colors, enhancing the eye appeal of the package. The label is securely welded to the cellophane wrapper with heat. Condensation in the refrigerated case will not loosen it, according to the manufacturer.

Lightweight Blower

A LIGHTWEIGHT blower for heat dispersion has been added to the line of L. R. Manufacturing Co., division of Ripley Co., Torrington, Conn. The one-piece housing with aluminum motor plate is 4½ in. from top and bottom. It is said to operate under all conditions of climate and temperature. The unit weighs 3½ oz. and delivers 50 c.f.m. at 8,000 r.p.m. It is available with shaft bores of either 0.1895 in. or ¼ in. Housings are light-



Lightweight blower for heat dispersion



DARNELL
CASTERS & WHEELS

Precision-made Darnell Casters with the DOUBLE BALL-BEARING SWIVEL assure a long life of efficient, economical service

Write for FREE MANUAL

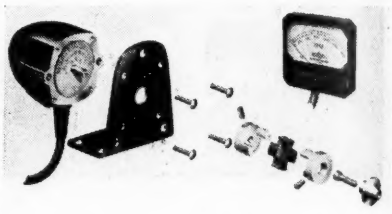
A SAVING AT EVERY TURN

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON CHICAGO 6, ILL.

weight, high-impact phenolic plastic. The wheels are turbo-type cadmium plated steel available for either clockwise or counter clockwise rotation.

Electric Speed Indicator

STURDY and accurate electric speed indicators have been developed by Reliance Electric & Engineering Co., Cleveland, Ohio. They give close readings of speeds from 100 to 5,000 r.p.m. and consist of two units. The pickup unit, a miniature six-pole alternator with a

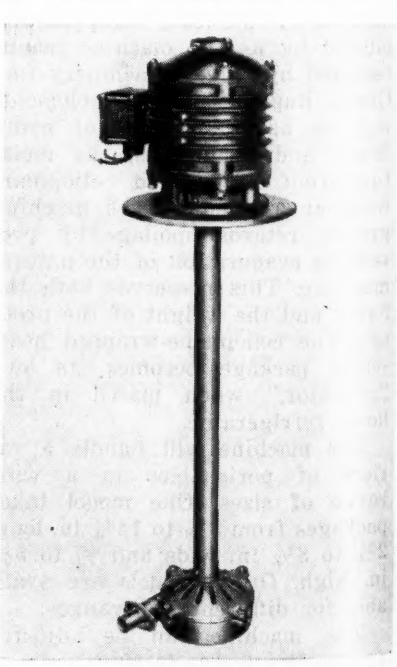


Electric speed indicator.

permanent-magnet rotor, is mounted on the shaft whose speed is to be measured. The indicator, utilizing a permanent magnet, meters the pickup output on a 3¾-in. scale which covers 95 deg. of arc. The indicator to be located at any distance from the pickup unit. Special scales are available to read in such units as feet per minute, and process cycles.

Vertical Sludge Pump

DESIGNED for continuous service under difficult conditions is a new vertical sludge pump manufactured by Claude B. Schneible Co., 2827



Vertical sludge pump.

MAKES SENSE!

Better bags for frozen foods, made with Alcoa Aluminum Foil

Reason it makes sense is this: aluminum foil will out-perform any other bag material in preventing moisture vapor transmission. That means an end to dehydration.

Being metal, aluminum foil can also provide a positive barrier to air. To gas. To liquid. To light. To odors. To grease.

Alcoa foil continues to give this protection at sub-zero temperatures of freezing and storage. Also, at high humidities. Aging does not affect it. Furthermore, it is tasteless, odorless, and non-toxic.

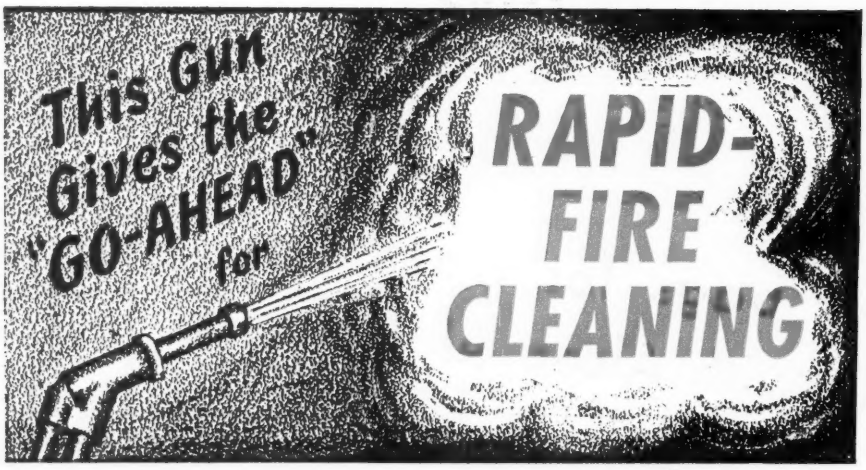
All these advantages explain why bag manufacturers are working with Alcoa Aluminum Foil. Tests are being made on foil bags of various constructions and on other types of frozen food packages for commercial packers and locker plants. They look most promising.

Would you like to make some tests yourself? Consult your package supplier or write ALUMINUM COMPANY OF AMERICA, 1845 Gulf Building, Pittsburgh 19, Penna.

Tests are now under way on these bags, made of Alcoa Aluminum Foil laminated to paper in a special construction developed by Rapinwax Paper Co., Chicago and Minneapolis.

ALCOA ALUMINUM

ALCOA ALUMINUM FOIL



Oakite Steam-Detergent Cleaning Expedites Daily Clean-Up Work

With a solution of the recommended Oakite cleaning material in the OAKITE SOLUTION-LIFTING STEAM GUN, Model No. 384, you give each clean-up job the 3-way advantages of EFFECTIVE DETERGENT ACTION *plus* CORRECTLY APPLIED HEAT *plus* MECHANICAL FORCE!

Sauces . . . syrups . . . oils . . . grease . . . vegetable particles . . . fruit juices . . . meat particles . . . fish fats . . . slime (in fact, virtually every type of deposit!) are speedily, thoroughly and economically removed from a wide variety of equipment and machinery where cleaning previously has been done manually.

Oakite Solution-Lifting Steam Gun

SAVES TIME . . . MANUAL EFFORT . . . SPEEDS WORK

Investigate the economy of installation! *NO* motors, pumps, injectors, or elevated tanks needed. Thirty to 80 lbs. steam pressure, steam and solution hose and an open container for holding the recommended Oakite solution only are required.

Typical Equipment On Which Sanitation Work Can Be Speeded

Exhaust Boxes • Blanchers • Scalders • Work Tables • Kettles • Vats, Tanks Syrup Fillers • Wrappers, Scalers, Labelers • Conveyors • Extractors • Pulp Tanks • Viscera Tables, Pans, Belts • Conveyors • Smoke House, Storage Room Floors, Walls, Ceilings • Cold Storage Boxes • Hog Dehairing Machines • Lard Drums • Cutting Tables • Cutters • Grinders • Stuffers Mixers • Slicers • Racks

7 ADVANTAGES ARE YOURS WHEN YOU USE THIS TIME-SAVING "WEAPON"

- CLEANS ANY SIZE equipment, machinery or parts.
- ELIMINATES tedious hand scraping, scrubbing, wiping.
- DOES WORK FASTER . . . EASIER.
- KEEPS CLEANING COSTS LOW.
- MORE THOROUGH results obtainable than with other methods.
- SIMPLIFIES CLEANING of machine and equipment parts of irregular shape.
- GREATER SAFETY to personnel, plant equipment — eliminates fire hazards.

WRITE TODAY for the FREE 28-page booklet giving complete details on making this simple yet highly effective Oakite steam-detergent cleaning installation.

OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE MATERIALS . . . METHODS . . . SERVICE — Buy Bonds for Victory — **CLEANING** FOR EVERY CLEANING REQUIREMENT

25th St., Detroit 16, Mich. The housing is made of abrasion-resistant material, and the housing top or cover is designed to serve as a strainer. The drive shaft is totally inclosed and is protected by a quill tube which serves as a structural member and which is secured to the mounting plate and the housing top. The drive shaft is slotted at the lower end, and the one-piece, wear-resistant impeller blade is inserted in this slot and riveted in place. The shaft is connected to the motor with a flexible coupling located just below the mounting plate.

The impeller is said to be readily accessible at the bottom of the pump housing and is easily removed for the replacement of wearing parts. A Venturi-type discharge assures constant head pressure. The motor is a totally inclosed splashproof type, with heat-dissipating grids.

Boiler-Control Panel

PREFABRICATED boiler-control panels which include all necessary connecting piping and electrical wiring for the operation of metering equipment and boiler-control systems are now offered by the Bailey Meter Co., Cleveland 10, Ohio. These panels are factory fabricated and tested by experienced instrument mechanics. All piping and wiring necessary for operation is installed as a unit according to a pre-arranged plan.

Husky Car Puller

CAPABLE of being operated by one unskilled laborer is a new car puller made by the American Engineering Co., Philadelphia 25, Pa. It is a husky machine with barrel, gearbox and motor integrated to function as a unit. A starting pull of 5,000 lb. may be obtained with a single line, or more by using va-

Car puller.

Artist: ZDZISLAW CZERMANSKY, native of Poland

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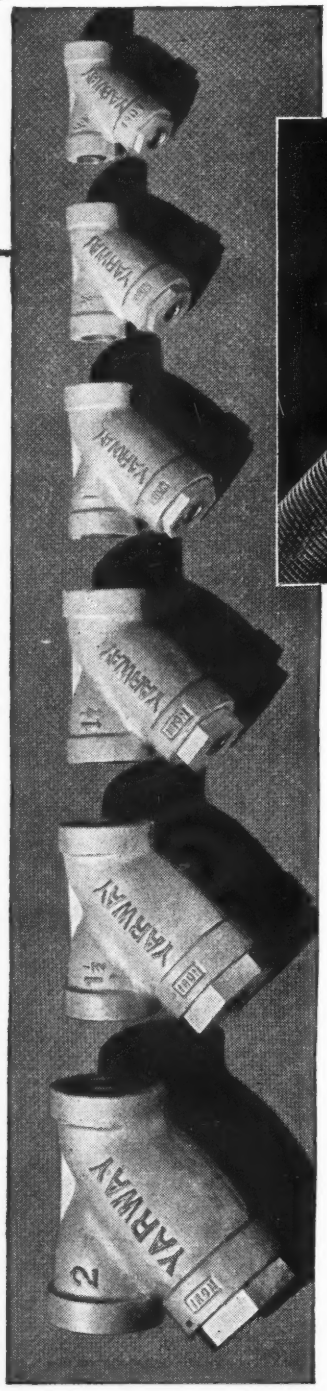
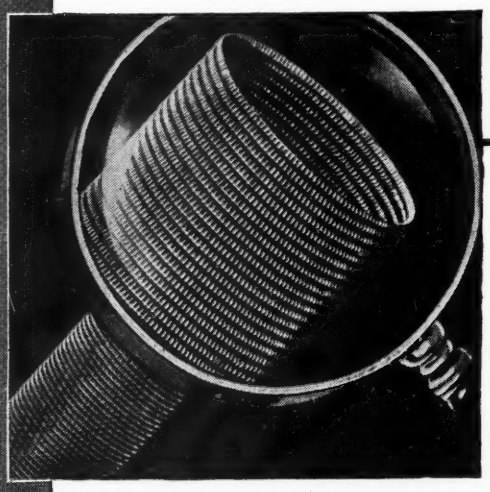
FROM CLOGGING

STEAM EQUIPMENT





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"The Screen's the Thing"

- *A High Grade Monel Woven Wire Basket* with mesh fine enough to catch the dirt—yet ample free area for passage of clean condensate, oil and other fluids.
- *Body Cadmium Plated Inside and Out for Protection Against Corrosion.*
- *Readily Removed Steel Blow-Off Bushing.*
- *Bushing Automatically Aligns Screen.*
- *Thousands in Use—Sold by Over 100 Mill Supply Houses.*
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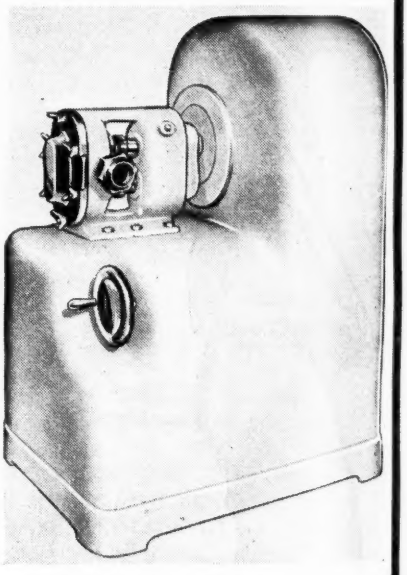
YARWAY STRAINERS

rious block combinations. The pull required on straight, level, dry track in good condition, and with car journals in good condition, is 30 lb. per ton. On inclines, add 20 lb. per ton for each 1 percent rise in track level. The puller is equipped with a 5-hp., intermittent-duty, hoist-type motor. The unit is completely inclosed in oil for lubrication.

Deluxe Food Pump

A NEW deluxe model pump for the food industries has been announced by Bump Pump Co., La Crosse, Wis. This unit is a fully variable-speed pump and is sanitary and compact. It provides a 4



Deluxe food pump.

to 1 speed variation simply by turning a handwheel. The gear and driving mechanism are mounted on ball bearings that operate in sealed cases filled with oil.

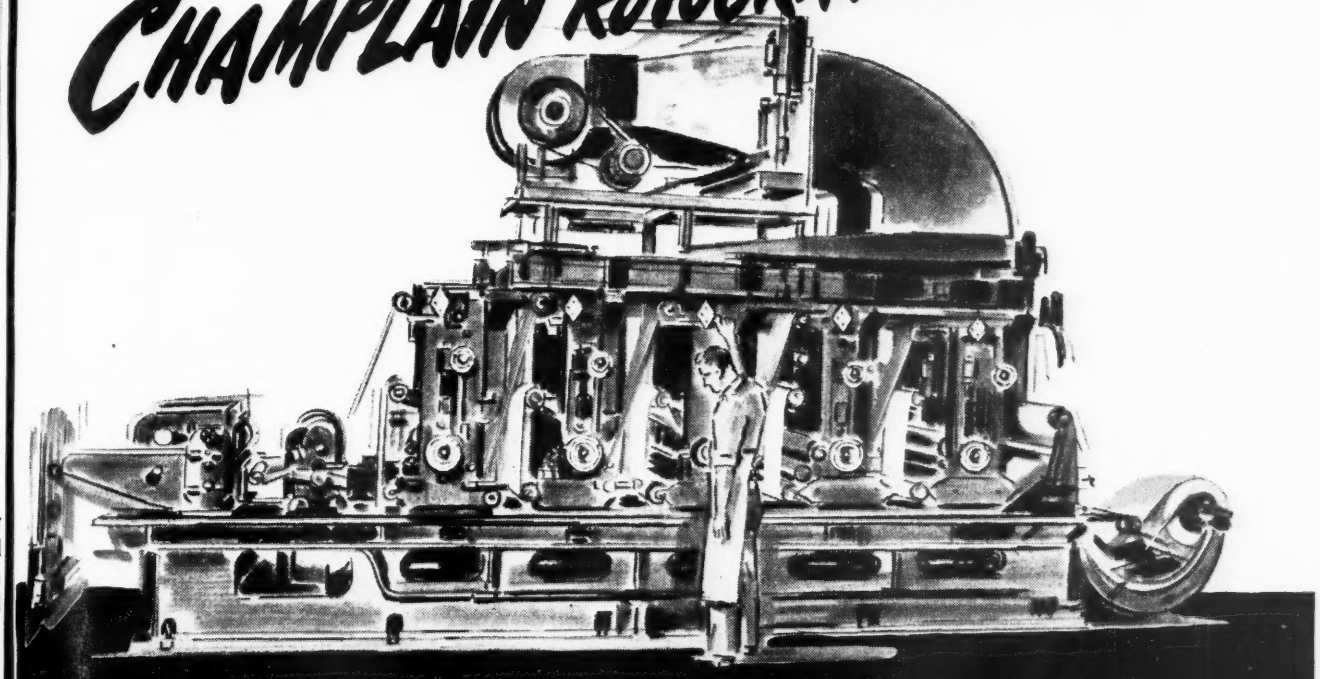
Non-contaminating Heat Exchangers

CONTAMINATION due to tube failure is avoided in the new line of heat exchangers manufactured by the Reliable Products Mfg. Co., Inc., 123 DeKalb Ave., Brooklyn 1, N. Y. This is accomplished by using a secondary heat transfer medium. Instead of having a heat source on one side of the exchanger and the material to be processed on the other, there is a heat transfer medium between them.

The secondary heat transfer medium may be water or eutectic mixtures. The medium is vented automatically, and liquid may be returned to original source, to the

1 ONE CONTINUOUS OPERATION 4 3 5 ..COLORS

CHAMPLAIN ROTOGRAVURE PRESS



INSTANT drying gravure inks make it possible for you to print any number of colors, one on top of another, and fabricate or rewind the printed stock, without offset in one continuous operation. The simplicity of the gravure principle puts an end to many of the difficulties of register control encountered when drying time must elapse between printing of colors or between printing and fabricating.

With the Speedry enclosed ink fountain (a patented Champlain feature) the ink remains uniform, no splashing onto the web is possible and the fountain protects the ink from foreign particles. Highly volatile solvents may be used without fear of evaporation. A wide variety of stocks, including cellophane and glassine, can be printed successfully in multi-colors in one continuous operation.

Write today for booklet entitled "Advantages of Rotogravure for Package Printing."

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SOME LINE!

That's what they say, too, about the complete Wyandotte line of cleaners. There's one of these specialized products for every cleaning and washing job in your plant—from washing utensils to aprons—floor cleaning to germicidal rinsing or spraying. They can be depended on to give you *thorough* sanitation.

Wyandotte service men are available, also, to help you put these products to the most efficient use. They will be glad to show you how you can effect the greatest saving of labor and materials.

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WYANDOTTE CHEMICALS CORPORATION • J. B. FORD DIVISION

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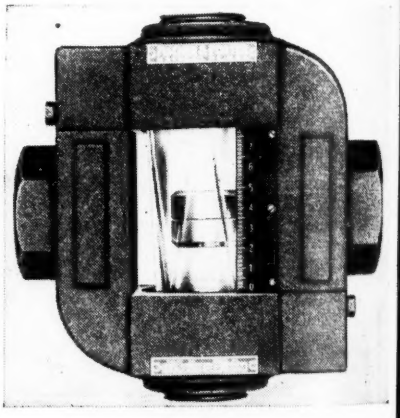
atmosphere or to a receptacle as desired.

The noncontaminating exchangers may be obtained either in U-types or straight-tube types with inside and outside floating head and universal expansion joints to compensate for the difference in expansion between shell and tubes. Some types permit the cleaning of the tubes or removal of the tube bundle without breakage of piping connections. The straight or U-tubes and the shells may be single or multipass. Shells are of welded or seamless steel, cast iron or other alloy. Tube sheets are of steel, naval brass or other alloy, to meet operating conditions.

Flow-rate Indicator

DESCRIBED as very compact and comparatively inexpensive is the flow-rate indicator manufactured by Fischer & Porter Co., 925 County Line Road, Hatboro, Pa. This indicator operates on the rotameter area-type principle and has a V-ported transparent metering tube



Flow-rate Indicator.

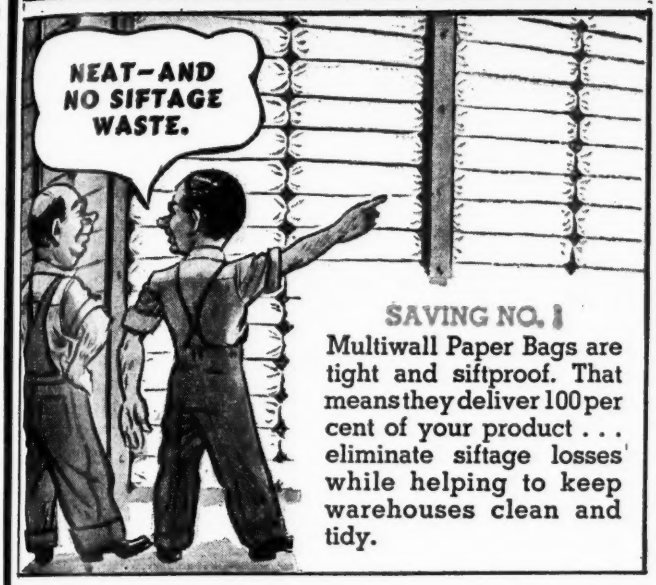
with a float which rises in direct proportion to the flow through the meter. One of the interesting applications is as a flow rate alarm. It is said to operate by flow rate changes and is equally sensitive at all points in its flow range because of straight-line calibrations.

Bacterial Filter

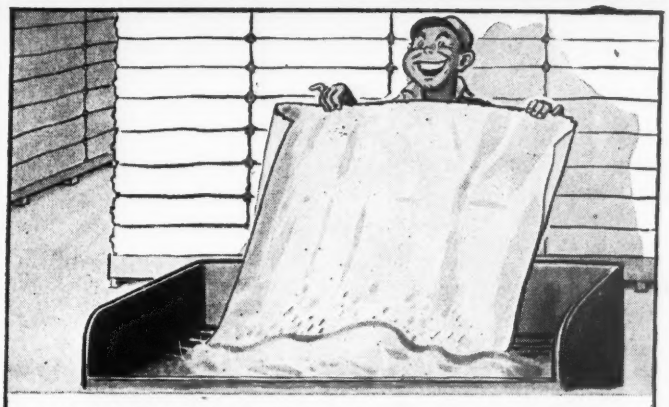
PYROGEN and bacterial retentive filters for laboratory and small production operations are announced by Ertel Engineering Corp., Kingston, N. Y. They feature a mechanical design which permits double filtration in series. One of the integral parts is a built-in stone fiber eliminator through which all of the filtrate must pass. The units are constructed of bronze-plated materials or stainless steel.

Check these Savings

AGAINST YOUR PRESENT PACKAGING METHOD



SAVING NO. 1
Multiwall Paper Bags are tight and siftproof. That means they deliver 100 per cent of your product . . . eliminate siftage losses while helping to keep warehouses clean and tidy.



SAVING NO. 2—Multiwalls save materials! This is because materials do not readily cling to the smooth interior surfaces of Multiwall bags. These bags empty clean, thus cutting retention losses.

SAVING NO. 3—Multiwalls prevent losses caused by contamination. Your product flows directly to the bag packing machine where the bags are filled and weighed automatically. Tight, strong Multiwalls repel dampness, dust, insects, and contaminating gases.

SAVING NO. 4—Multiwalls help conserve manpower and thus reduce labor costs. Experiments have shown that *one man* can load and stack Multiwall Paper Bags as fast as *two men* can handle comparable tonnage in heavy fabric sacks or drums.

MULTIWALLS are tough and sturdy, too. Made of from 2 to 6 plies of special kraft paper, they will be specially designed to meet specific conditions involving excessive dampness and rough handling.

So, if you are not already using Multiwall Paper Bags, why not find out how they can save money, minutes, and material. Your inquiry will receive prompt and careful attention. Write today.

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NEW SERIES "B" EDTBAUER WEIGHER

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Materials having large particle sizes, up to ½ inch in diameter are weighed accurately, economically and efficiently with this new EDTBAUER Disk-type Power Feed Weigher. Users invariably express satisfaction with their dependable performance and long life. Especially designed for packaging products like lima beans, animal feed pellets, etc. Made in four sizes for weighing from one to 50 pound discharges. May we mail you complete information?

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CATALOGS, BULLETINS

FOOD PLANT EQUIPMENT

Self-priming Centrifugal Pumps—Marlow Pumps, Ridgewood, N. J., has published a 20-page booklet on self-priming centrifugal pumps. The principles of centrifugal action, the physics of pumping and the evolution of self-priming centrifugal pumps are described.

Heaters and Coolers—Bulletin No. 35-76B, by the American District Steam Co., North Tonawanda, N. Y., describes three new heaters and coolers, giving capacities and prices. It is a 12-page, loose-leaf, two-color bulletin.

Steam-jet Ejectors—Steam-jet ejectors of various types are illustrated and described in an 8-page bulletin by Ingersoll-Rand Co., 11 Broadway, New York 4. Operating principles and characteristics are discussed and various applications described.

Cold-water Deaerator—Copies of Reprint No. 36 describing the application and general design of cold-water deaerators may be obtained from Cochrane Corp., 17th and Allegheny Ave., Philadelphia 32, Pa. The reprint describes how these deaerators prevent corrosion of pipe lines, heat-exchange equipment, and so forth.

Pork Sausage Production—Many suggestions for processing, handling and seasoning pork sausage are made in a 24-page booklet, "Here's How," just published by Basic Food Materials, Inc., 806 Broadway, Cleveland 15, Ohio. The booklet contains many tips on production procedure and has several chapters dealing with various types of pork sausages and seasoning.

Monel and Nickel—Extensive data are given in a 54-page bulletin, "Corrosion," issued by International Nickel Co., 67 Wall St., New York 5. Numerous tables give the quantitative resistance of various nickel alloys to food and other products. The application of nickel, Monel and other nickel alloys is reviewed and analyzed. Tables list nearly 500 different corrosives to which these alloys are resistant.

Optical Fluorescence Comparator—A new bulletin has just been issued by Photovolt Corp., 95 Madison Ave., New York 16, describing an optical fluorescence comparator. This instrument has been developed particularly for quantitative vitamin B_1 and B_2 determinations in food products. It is especially suited to routine control work where speed and simplicity of operation are of primary importance. The bulletin describes in detail the principle on which this instrument operates.

Deep-well Pumps—A new deep-well pump bulletin, printed in three colors, has been issued by Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif. It presents cutaway sketches of three deep-well pump types having more than 100 impeller designs, each with different hydraulic characteristics.

Air Diffusers—Sketches, charts and instructive text, providing the engineering data necessary for the proper application of air diffusers, are included in a catalog issued by the W. B. Connor Engineering Corp., 116 East 32nd St., New York 16. Separate sections are devoted to accessory equipment. The material is in a durable loose-leaf binder to facilitate the insertion of supplementary data, which will be forwarded from time to time.

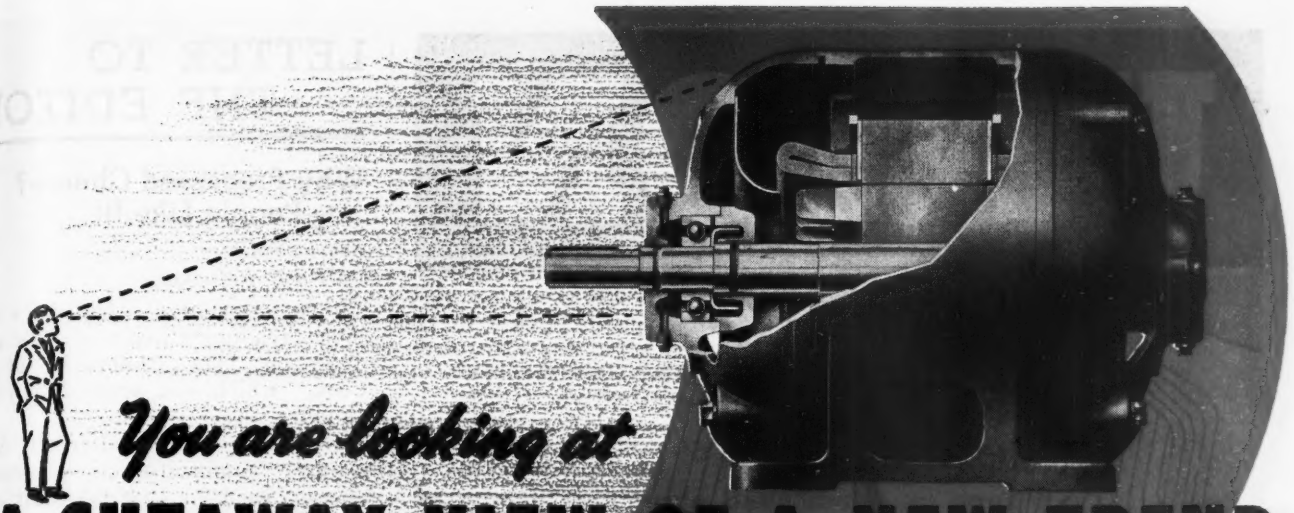
CONTROL EQUIPMENT

X-Ray Diffraction Technics—Announced by North American Philips Co., Inc., 100 East 42nd St., New York 17, N. Y., is a new 12-page booklet that describes x-ray diffraction technics and applications. Utilizing the diffractive effect produced on x-radiation, the technic can be applied in determining structural changes in casein during the ripening of natural cheese, as an example. The technic can also be used to reveal the crystallization of lactose in milk powders and ice cream. Also, butterfat that has become oxidized produces a different spacing on the radiographic film than does fresh butterfat.

Buffer Tablets—Buffer tablets ranging from pH 2 to pH 12 are described in a 4-page bulletin by Wilkens-Anderson Co., 111 No. Canal St., Chicago. The tablets are certified to be within plus or minus 0.02 of the specified pH value.

Steam and Liquid Control—Steam and liquid control units are described and illustrated in a 40-page catalog by O. C. Keckley Co., 400 West Madison St., Chicago 6. Precision pressure regulating valves, pump governors, temperature regulators and water gages are among the items listed.

Electronic Products—North American Philips Co., Inc., 100 East 42nd St., New York, offers a new 8-page condensed catalog on Searchray inspection units, Geiger-counter x-ray spectrometers and film-type x-ray diffraction equipment.



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A CUTAWAY VIEW OF A NEW TREND

in motor design

Two decades ago the purchaser of squirrel-cage motors had but one choice—the open motor. If operating conditions proved too severe, the only answer was to be found in frequent replacements.

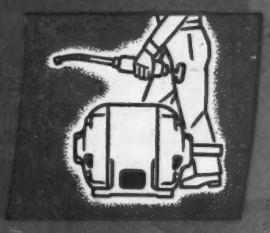
Then came a period of new development in mechanical design, which resulted in the birth of dripproof, splashproof, totally-enclosed, fan-cooled, and a host of other new types, each designed for operation under certain adverse conditions.

But today there is a new trend—represented by Crocker-Wheeler Protected-Type Motors. These motors, besides having the surplus capacity of open designs, provide protection against many of the most common hazards encountered in operation. They may be used for many services for which enclosed and partially-enclosed motors have been specified in the past, *and yet, Protected-Type Motors cost no more than open motors.*

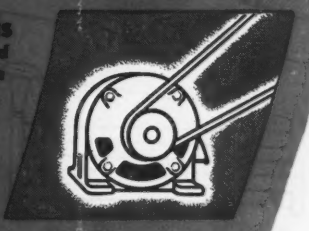
When and Where to Use Protected-Type Motors

WHERE THERE IS DRIPPING LIQUID
Because Protected-Type Motors are dripproof; falling water, oil, or other liquids cannot enter the windings. All ventilating openings are shielded.

WHERE THERE ARE FALLING CHIPS
Protected-Type Motors are ideal for machine tool and similar applications where metal chips and other foreign matter might injure the windings of less well-protected motors.



WHEN INSPECTION VISITS ARE FEW AND FAR BETWEEN
Because rotors are practically indestructible, stator windings are amply insulated, and ball bearings require attention only annually (sleeve bearings are optional), Protected-Type Motors call for minimum maintenance.



FOR ALL GENERAL-PURPOSE APPLICATIONS
Rated 40C rise, full-load continuous duty, with a 15 per cent service factor, these motors are suitable for all general-purpose applications. Mounting dimensions conform to N. E. M. A. standards.

FOR COMPLETE DETAILS, send for your FREE copy of this NEW four-page bulletin. Shows how these motors are protected; why they will give long trouble-free service. Write today — no obligation.

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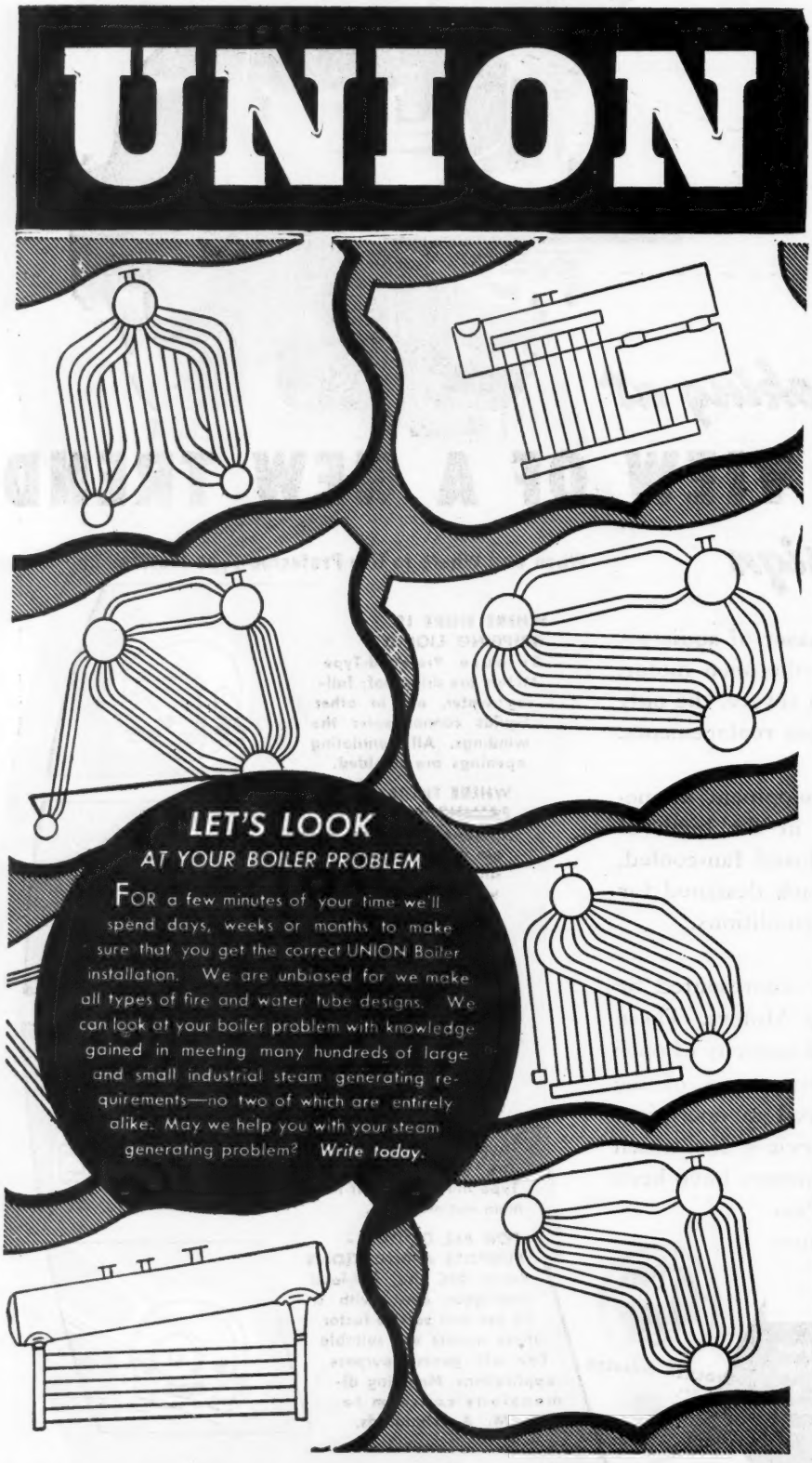
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LETTER TO THE EDITOR

Why Processed Cheese? —People Like It!

To the Editor
Of Food Industries:

THOSE of us here at Borden's enjoyed reading Crosby Gaige's address on "The Philosophy of A Cook," which you printed in your January issue.

Referring specifically to Mr. Gaige's comments on processed cheese, we'd like to take out our handkerchiefs and cry with him. Instead, we'll pass on to him, through you, some observations which may make him worry less about the cheese preferences of the growing children.

Prior to the war, which obviously has upset the normal marketing of the cheese industry, approximately two-thirds of all the cheese consumed in the United States was natural cheese; one-third was processed cheese. From 1935 to 1941, the cheese industry made rapid strides in merchandising cured natural cheddar and natural Swiss cheese.

This progress has been possible as retail food stores increased their facilities for stocking, refrigerating and displaying a full line of cheese.

It is our hope that we can resume this trend promptly when war restrictions are removed.

Strange as it may seem, many people prefer the mild bland flavor of uncured natural cheddar. This is especially true of children. As we get older and start using hair tonic, our tastes apparently become more settled and fixed. We like definite sharp flavors instead of sweet- and bland-flavored foods popular in childhood.

Another point which might interest Mr. Gaige is that much of the processed cheese is used by restaurants and in box lunches for sandwiches. Outlets of this type could not use natural cheese because of its relatively poor slicing properties and because the shrinkage and waste would be high. When natural cheese is heated in home cooking, it loses some of the flavor and aroma it possesses in its unheated state, just as it loses it when heated for processed cheese.

There is a need and a place for both processed and natural cheeses, and we in the cheese industry look forward with enthusiasm to the

WHICH IS YOUR APPROACH?

Do you try to compromise your process and certain desirable qualities of your product so as to be able to use "standard" types of dryers which have been made to handle a great variety of "average" jobs?

OR

Do you consider that your process and your product are important enough to demand a dryer made specifically to meet your most exacting requirements?

Jeffrey Engineers are prepared to work with you in determining your EXACT drying requirements—and to design a drying system to fit your needs EXACTLY.

Jeffrey-Traylor Type H Direct and Indirect drying systems (patented) are custom-built for you as a result of a careful analysis of your problem. Ask for Catalog No. 750.

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LAMSON *Conveyors*

Move a Million Bottles a Day at

PEPSI-COLA'S LONG ISLAND CITY Plant

Because bulk and weight are high, and unit profits are a fraction of a cent, bottlers of soft drinks must keep handling costs low! At PEPSI-COLA'S home plant on Long Island, LAMSON Engineers have succeeded in achieving almost complete mechanization of handling for lower costs, and greater profits.

Telescopic conveyors receive the empties from inside the trucks, and move them from one process to another in the plant until they are rolled out over the outgoing conveyor right into the delivery truck.

LAMSON, designers and installers of this complete system, can solve YOUR handling problems with either stock or specially engineered equipment! Write for our folder on conveyors in bottling plants.

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Send me your folder describing conveyors in bottling plants.

Name..... Position.....

Company.....

Address.....

State.....

postwar era when we can again cure cheddar cheese and tell consumers how good it is.—WILL A. FOSTER, *The Borden Cheese Co., New York, N. Y.*

Food Around The World

(*Continued from page* 85)

In Jamaica, a movement has been made towards developing a fruit canning industry of considerable size, packing jams and jellies from the native oranges, grapefruit, mangoes and guavas, as well as citrus peel and pulp.

Seal Liver Oil

Experimental work at Cape Town University has shown that adult seal livers are as rich in vitamins as halibut and cod livers. So also are shark liver. Britain has been importing grey shark livers for use in fortifying wartime margarine and conditioning the RAF night fighter pilots. Seal livers have produced oils with a potency of 500,000 international units of vitamin A per gram, compared with 5,000 to 100,000 units in shark liver oils.

Where Food Standards Stand

(*Continued from page* 87)

certain foods for which definitions and standards of identity would be adopted in due time and exempted those products from the requirement that ingredients be stated on the label. This set up a program of standardization which he estimated could be covered in about two years. Actually, however, it was not completed in that time. In addition to the foods originally exempted from labeling requirements, other important foods were included in the program.

When a standard for a basic food is considered, it is highly desirable to consider related foods at the same time, since as a rule many of the same questions are involved and many of the same manufacturers are interested. It has been customary, therefore, to cover a number of related foods at a single hearing.

They Go to Court

As was to be expected, the standards finally formulated have not suited everyone, and resort has already been had in several instances

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Here is high-speed uniform heat—precision controlled and directed—offering tremendous possibilities for new products and new processes . . . for faster, more efficient production . . .

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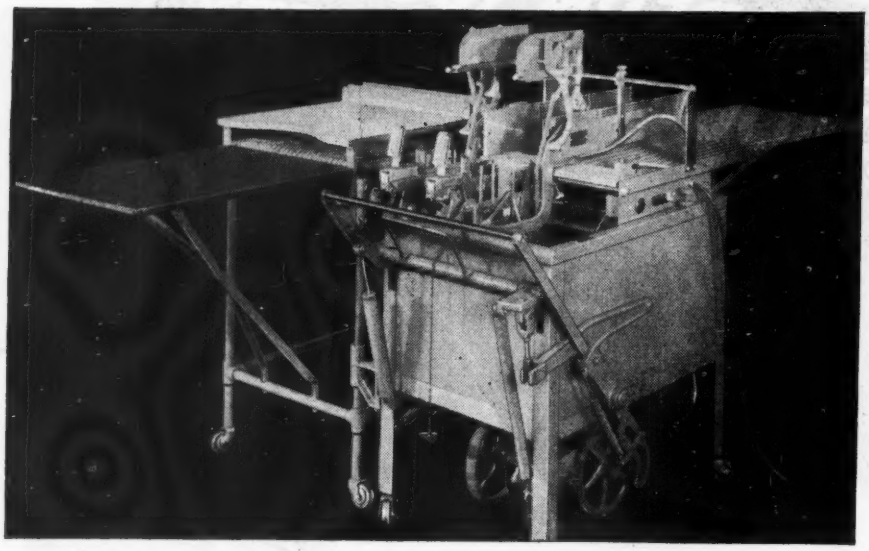
Miller

MODEL M P S WRAPPING MACHINE



Wraps many sizes, cuts its own wrappers from rolls. Quickly adjustable without tools. Standard Model heat seals. Can also be furnished to glue seal. Mounted on casters, the Miller Model MPS can be rolled to the job. Plugs into any wall outlet for power.

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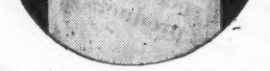
● **SIMPLEX HIGH SPEED BAG MAKER**

Makes 2500 to 4000 perfect bags per hour.



● **HOLM FILLING MACHINE**

Automatically fills, by weight, 18 to 20 bags or cartons per minute.

● **AMSCO ROTARY BAG SEALER**

Seals up to 75 bags per minute automatically.

MACHINES FOR: WRAPPING, BAG MAKING, BAG AND CARTON FILLING, BAG CRIMPING OR CLOSING, GLUING AND SHEETING, SANDWICH MAKING.

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to the court review provided by the Act. Probably the most interesting questions brought before the courts in connection with food standards were raised by the action of the Admnistrator in establishing a definition and standard of identity for enriched farina. Many precedents were established in formulating standards for enriched foods. The standard for enriched farina was very similar to standards promulgated for enriched flour, enriched self-rising flour and enriched bromated flour. The standards for both plain and enriched farina were litigated and finally found their way to the Supreme Court, which upheld the standards and gave a long and informative opinion clarifying many points relating to the authority of the Administrator to make legally binding standards. Other interesting cases arose from reviews by the courts of the definitions and standards of identity for oleomargarine, dried skim milk, and cream cheese.

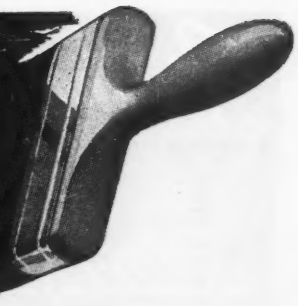
From both proponents and opponents of food standards has come varied criticism. It has been said that the standards are difficult to understand. This seems to be an unfortunate result of the necessity of formulating the standards so that they cover all contingencies that may arise in determining whether a food complies with their requirements. It seems likely, however, that, as interested persons become more familiar with the way the standards are drawn, interpretation of their provisions will not seem unduly complicated.

Some Criticisms

Another criticism has been that too much time is consumed in the various stages leading to the adoption of the standard. No doubt there is room for improvement in this respect. But considering the far-reaching effect of the standards, it appears unlikely that interested persons will leave anything to chance in presenting evidence upon which the findings of fact will be based. These findings are the foundation upon which the standards are formulated. If founded on substantial evidence, they will not be changed by the courts.

Some criticism is based on the allegation that the definitions and standards of identity are unnecessarily restrictive and many tend to stifle improvements in methods of manufacture and the use of new ingredients. Whether this criticism is warranted depends largely on the basic question of whether it is

COLOR



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What will you LOSE by using it?

This down-to-earth booklet will help you decide for yourself!

THERE'S a lot of discussion going on these days over the idea of using more color in the industrial plant.

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2. ***What will we GAIN by using color?***
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With the help of some of America's top ranking light and color authorities, we have prepared expressly for industrial plant executives a little 16-page booklet which we believe will help you arrive at the answers to these three questions. Entitled "Color for Industry," this booklet covers the use of color for every plant area and surface and outlines a simple but effective plan for the promotion of plant safety through the use of color.

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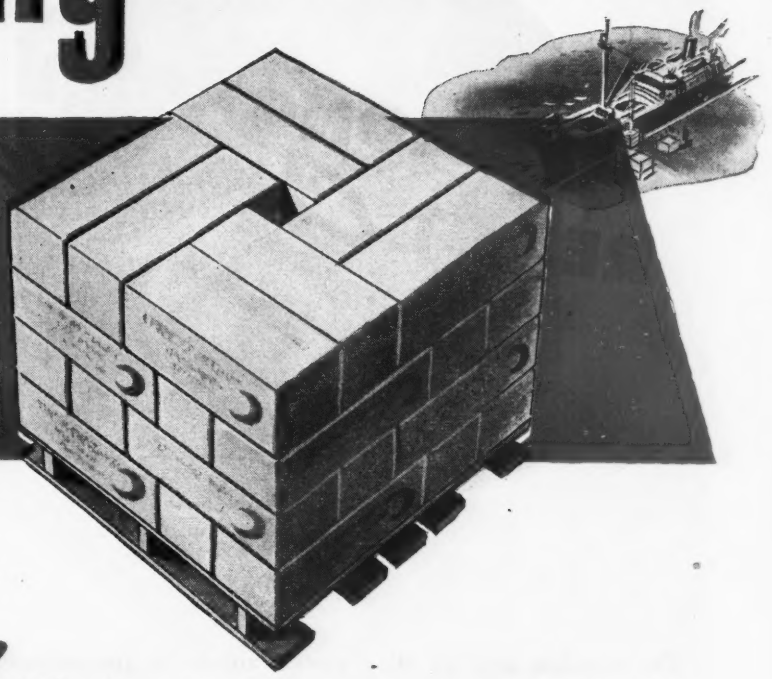
desirable for each individual manufacturer to determine what are improvements or whether this should be determined after hearing the testimony of all interested persons. To a large extent, new developments in food manufacture which may require the amendment of standards have involved the addition of a chemical substance. So there is a great deal to be said in favor of the hearing procedure. As far as the present standards are concerned, two already have been amended to provide for new processes. In both of these there is an addition of some foreign ingredient to the food. The definition and standard of identity for canned tomatoes was amended to permit the use of calcium chloride for the purpose of making the tomatoes more firm and more resistant to breaking up during shipment. The standard for canned peas was amended to permit the use of certain alkaline substances in the canning process so as to protect the chlorophyll from destruction in processing.

Points about which there has been considerable difference of opinion at recent hearings have had to do with the use of substances having the effect of retarding bacterial and mold growth, and the use of substances which might permit the use of raw materials of doubtful quality. All such questions have been decided by the Administrator on their merits.

Hearings by Petition

In addition to calling hearings on his own initiative, the Administrator is required to call a hearing upon a petition from an interested industry or substantial portion thereof for the purpose of adopting, amending or repealing a regulation, where reasonable grounds are furnished. A few such petitions are before the Administrator at the present time. It is likely that these will be taken up before further hearings are called on the administrator's initiative. Standards of identity for a number of important foods originally scheduled for consideration before the war will be taken up as personnel becomes available for handling the work. Among such foods are corn products, canned fruit juices, various cheeses (including processed cheeses) and skim milk beverages flavored with cocoa. Suggested quality standards for various canned fruits and vegetables for which at present there are only identity standards also are ready for early consideration.

Palletizing WITH ADHESIVES



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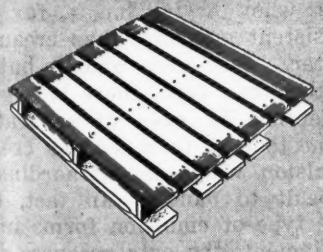
PALLET ADHESIVE # 4 was formulated in collaboration with military authorities. It is the first adhesive to be tested and approved for unitizing corrugated or solid fibre shipping containers on standard wooden pallets. Its high shear strength locks the unitized load during shipping; its low tensile strength permits easy unit separation during unloading — with a minimum of tearing that leaves the cases fit for reuse. Adhesive palletizing is now being adapted to wooden boxes.

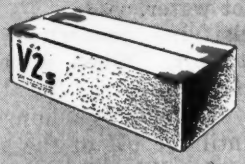
SAVES
- Steel
- Labor
- Time
- Containers

PREVENTS
- Break-up
- Damage
- Pilferage

EASY TO APPLY



PALLET ADHESIVE # 4 is applied by brush around the perimeter of the pallet. Then the first layer of cartons is placed in position.



An L-shaped strip of adhesive is then applied to the top corners of each carton — to lock the succeeding layers in place.

Now SPEEDS MULTIPLE-UNIT WAR DELIVERIES

All war contractors—large or small—can now make palletized shipments *whether or not* they are equipped with special tools for steel strapping and mechanical handling equipment.

A fast-setting, mold-proof, brush applied adhesive . . . National's PALLET ADHESIVE #4 . . . permits unit loading either inside the plant at the delivery conveyor — *or directly on pallets in the freight car or delivery truck.*

Domestic shipments to prime contractors equipped with fork-lift trucks — or to the home depots of the Services *need no further binding.*

Overseas shipments can be 3-strapped (instead of 6-strapped) by the Services at ports of embarkation or by specially equipped contractors.

Government specifications calling for palletized units are rapidly being extended to all contractors. The advantages of palletizing with adhesives are many: Unit loading saves time, labor, critical metal and handling equipment. Rehandling caused by load break-up is eliminated. Damage in transit is lessened. Pilfering is discouraged. And savings in container costs are made possible.

Further information is available NOW! Address: National Adhesives, 270 Madison Avenue, New York 16; 3641 So. Washtenaw Avenue, Chicago 32; 735 Battery Street, San Francisco 11, and other principal cities. In Canada: Meredith, Simmons & Company, Ltd., Toronto and Montreal.

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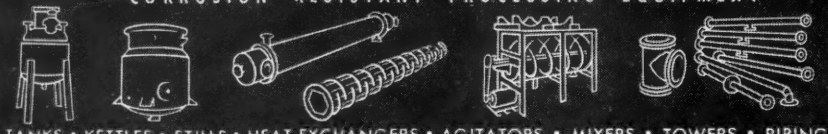


TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

Dries Butterfat

(*Continued from page* 81)

it in the vent hole. This is then spot soldered. The filling table is laid out for easy working height and provided with roller conveyors along its entire length.

Two tins are packed in a wooden case which has external dimensions of 20½x40¾x10⅜ in. The volume per 100 lb. of butterfat is 2,327 cu. ft. The space saving, compared to shipment of the butter in 59-lb. boxes, is 13.4 percent. And this is added to the saving through elimination of refrigeration.

Efficiency of Operation

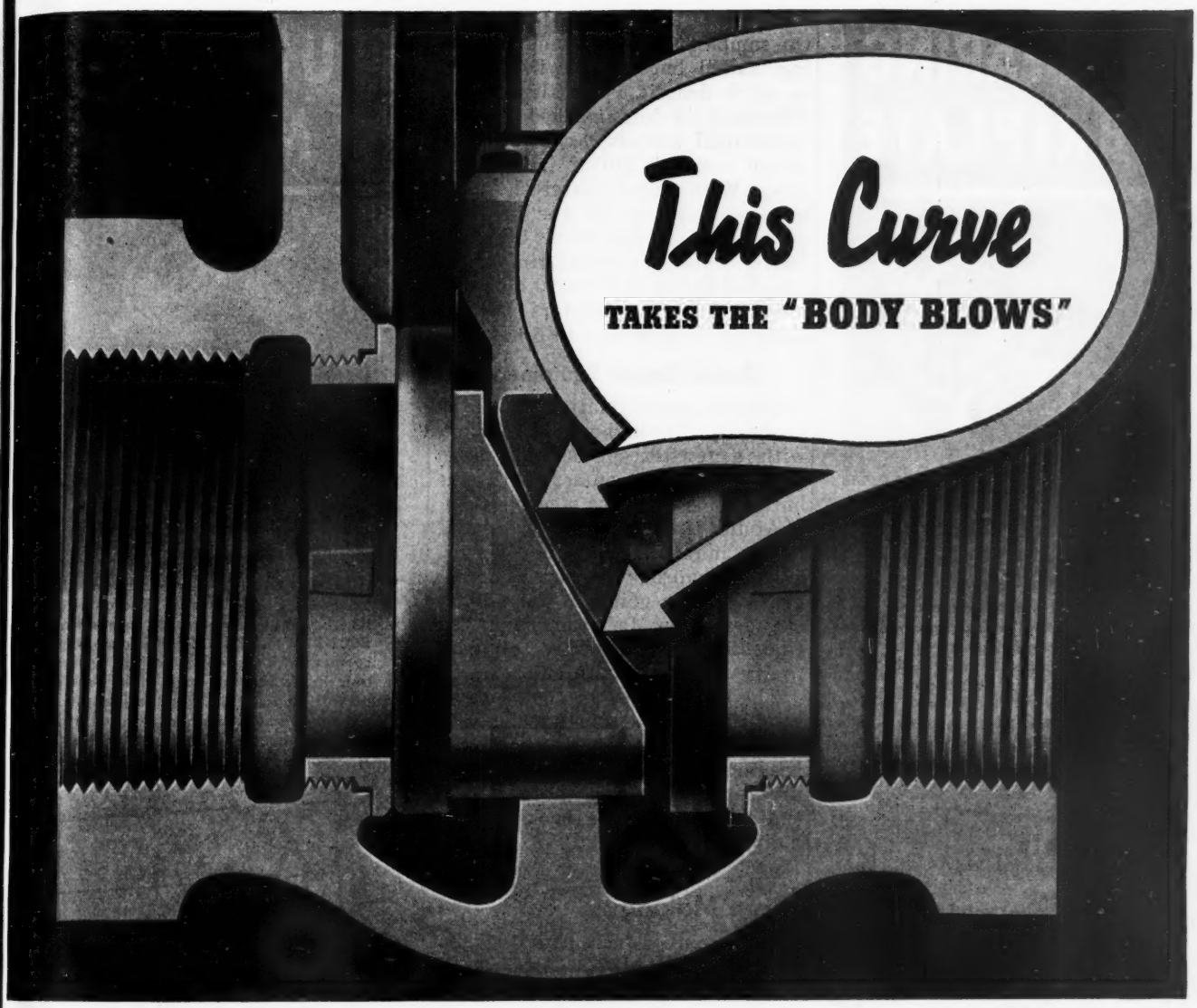
Fat loss averages from 0.9 to 1.3 percent of the fat in the butter. Direct losses occur in the form of spillage and as fat discarded in the serum, which has been found to have a minimum fat test of between 0.6 and 1 percent. Some of the additional loss, that is, the difference between the 0.4 percent on the original butterfat which would be accounted for by the fat in the serum and the actual loss reported, may be due to fatty acids in the serum, to the fine spray from the separators and to the fat which adheres on the parchment removed from the blocks of butter.

Choice of Butter

Butter with good oiling-off properties is desired. It has been found that whey butter has a far less persistent emulsion than creamery butter. But, even among butters of the same type, there is a great difference in ease of separation. Some tend to form a thick creamy emulsion which is extraordinarily difficult to handle. In fact, once this type of emulsion forms in the equipment, the only recourse is to shut off the feed to the melter, run all the material under process through the separators and retreat it, possibly with the addition of very hot water.

Emulsifying properties are related to pH. When a persistent foam first appears, the tendency can be overcome by adding caustic soda until the pH of the serum is 8.0 to 8.5. When butter is to be made especially for dehydration, the cream may be neutralized before pasteurization, using a sodium carbonate-bicarbonate mixture. Over-neutralization leads to difficulties with undecomposed bicarbonate.

Alkalinity reduces sludge formation in the separators, probably by keeping the casein in solution.



LINE strains, high temperatures and pressures will distort the body of any valve. Only Darling fully revolving double disc parallel seat gate valves have the curved wedge face and transverse bevels that permit the gate to adapt itself to out-of-line positions the valve seats may assume. There's no need to jam or force it; it fits naturally, easily and tightly.

The valve assembly consists of four simple parts—two discs, two wedges. These can easily be removed for inspection or maintenance without taking the valve from the line. When the valve closes, the two wedges force the discs firmly against the valve seats. On opening, the first quarter-turn instantly releases the wedges and frees the discs to be raised with less seating wear.

The discs are fully revolving through 360° and seat themselves in a different position each time the valve is closed. Thus wear on disc and seat is uniform, and life-long, tight closing results.

For drop-tight closing, year after year, for long, economical, trouble-free service, specify Darling Valve.

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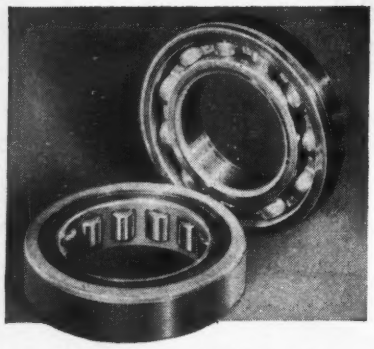
BALL BEARING LUBRIPLATE



FOR ALL TYPES OF ANTI-FRICTION BEARINGS

BALL BEARING LUBRIPLATE is a single grease type lubricant developed for general use on roller, ball and plain sleeve bearings operating at speeds up to 5000 RPM and at temperatures up to 300° F. Its performance is outstanding. BALL BEARING LUBRIPLATE not only does a better lubrication job, but it definitely gives protection against the arch enemy of bearings . . . corrosion. Increase the life of your bearings with LUBRIPLATE.

LUBRIPLATE

Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

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Salt increases sludge formation. On samples from the same churning, salted butter gave five times as much deposit as unsalted. The difference is less marked in the commercial process because of the serum removal, but it is appreciable. With salted butter the time between cleanings of the primary centrifuges varies from 5 to 12 hours, while the usual time with unsalted butter is 10 to 16 hours or more. Serum separators require cleaning at least once in 5 hours.

Avoid Copper Equipment

Copper contamination must be avoided. Throughout the plant, with a few exceptions, all metal that comes in contact with the butterfat is stainless steel.

At the time the plant was built, it was impossible to obtain a suitable non-cuprous fat pump for the melted butter going to the gravity cylinders. The MacEwan pump was tinned before use and has not added to the copper contamination.

The bearings on the cooler are of solid tin, because some trouble with copper was experienced when brass bearings were in use, in spite of precautions to keep the fat from the bearings feeding back into the main stream.

Sirup Making

(*Continued from page* 102)

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MAKE ONE BEARING OUTLIVE TWO

LUBRIPLATE No. 205 is a lubricant developed for use in grease type anti-friction bearings operating at speeds from 5000 RPM to 20,000 RPM. Users of high speed machinery tell us that this remarkable lubricant often more than doubles the life of bearings. For the lubrication of anti-friction bearings with oil type housings LUBRIPLATE No. 1 or No. 2 is recommended depending upon the operating speed.

℞ FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

No. 70—For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

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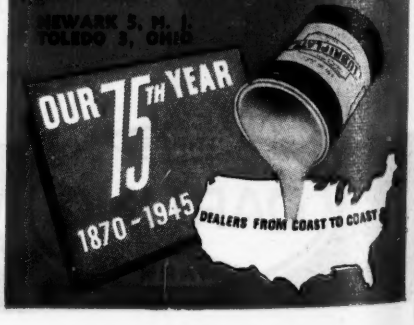

DID you ever stop to consider what your product's chances are *inside* the package . . . what opportunity it has to attract and sell the shopper . . . to deliver to her the original quality and full value that will bring her back for more?

WHAT ABOUT TRANSPARENCY?

Transparent packaging lets the product be its own salesman. It enables the shopper to *see for herself*. It lets eye appeal help the product cash in on impulse buying, the basis of a large portion of all consumer purchases. You get the powerful sales stimulus of full product visibility with *transparent* Du Pont Cellophane.

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This fundamental function of good packaging extends beyond protection from contamination and damage. It calls for the protection of freshness, flavor and all-round quality. You get the protection you need with *moistureproof* Du Pont Cellophane.

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Many merchandising authorities are stressing the need for lower postwar distribution costs. This calls for a *low cost* packaging material . . . and one that can be used most efficiently on automatic wrapping machines. You get true packaging economy with Du Pont Cellophane.

Du Pont research has helped make possible 20 price reductions in Du Pont Cellophane. It is constantly at work to find new ways to increase packaging efficiency and economy.

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Shows what it Protects—at Low Cost

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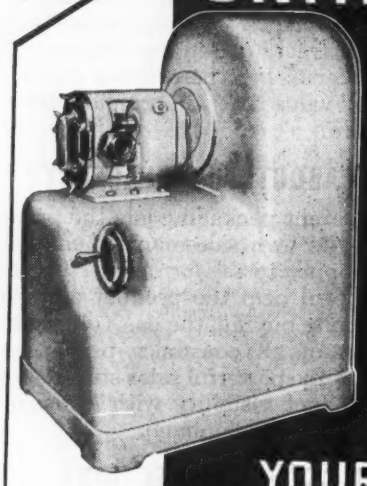

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The latest and modern development in positive type sanitary pump units . . . a fully variable speed pump that is sanitary and at the same time compact . . . can be furnished with any size Bump Pump in either the sanitary or portable units. Quiet and efficient operation. Standard motors used without any special flanges or characteristics.

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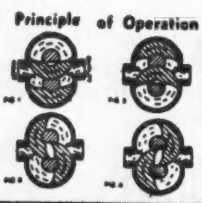
New complete catalog describing this compact unit, as well as the complete line of Bump Pumps, is yours for the asking. Write for it today.

Principle of Operation



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BOOKS

Sugar Data

CANE SUGAR HANDBOOK. By Guilford L. Spencer and George P. Meade. Published by John Wiley and Sons, 440 Fourth Ave., New York, N. Y. 834 pages; 6x8½ in.; cloth. Price, $7.50.

This is the eighth edition of this book to make its appearance since 1895. It has been completely revised, since the last edition in 1929, and is considerably broader in scope.

The book offers a survey of the sugar manufacturing and refining processes, selects analytical procedures and reference tables for the control chemist, explains and compares methods of chemical control of sugar and indicates additional sources of information.

Streamlining Congress

STRENGTHENING THE CONGRESS. By Robert Heller. Published by the National Planning Association, 800 Twenty-first St., Washington 6, D. C., as Planning Pamphlet No. 39, 1944. 41 pages; 5¼x7½ in.; paper. Price, 25 cents.

This little booklet has raised eyebrows in and out of the halls of Congress. It demonstrates how that body can bring its functions and procedures up to the efficiency requirements of the present day. The author points out that some such streamlining must be accomplished if Congress is to do the job demanded of it in the moving times of the present and immediate future.

The program presented here is bound to create controversy, but the book's pages will prove of interest, both because of the changes proposed and because of the insight they offer into the functional procedure of the national legislature.

The Economic Transition

DEMOBILIZATION OF WARTIME ECONOMIC CONTROLS. By John Maurice Clark. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1944. 219 pages; 5¾x9 in.; cloth. Price, $1.75.

"This is not a simple book," declares Theodore O. Ynetema, research director for the Committee for Economic Development, "but it will richly reward the thoughtful reader." It is a study of the problems involved in the relaxation of wartime economic controls. The author emphasizes the control over production, prices and wages. While practically every phase of the oncoming reconversion period strikes some aspect of the food industry the problems discussed here form the very core of the problems the food people must face.

The book offers a positive and practical outline of what may be expected and how those expectations may be met. Even the chapter on *How Not To Reconvert* strikes an affirmative note.

GOVERNMENT PUBLICATIONS

PICKING MATURITY OF APPLES. By Mark H. Haller. Department of Agriculture, Circular No. 711. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents. Summarizes orchard practice as related to market usefulness by variety of apple.

INTERNATIONAL TRADE INCREASES DEMAND FOR FARM PRODUCTS. Department of Agriculture, AIS-1. Free. A postwar planning publication.

TENTATIVE U. S. STANDARDS FOR GRADES OF SWISS CHEESE. War Food Administration. Free.

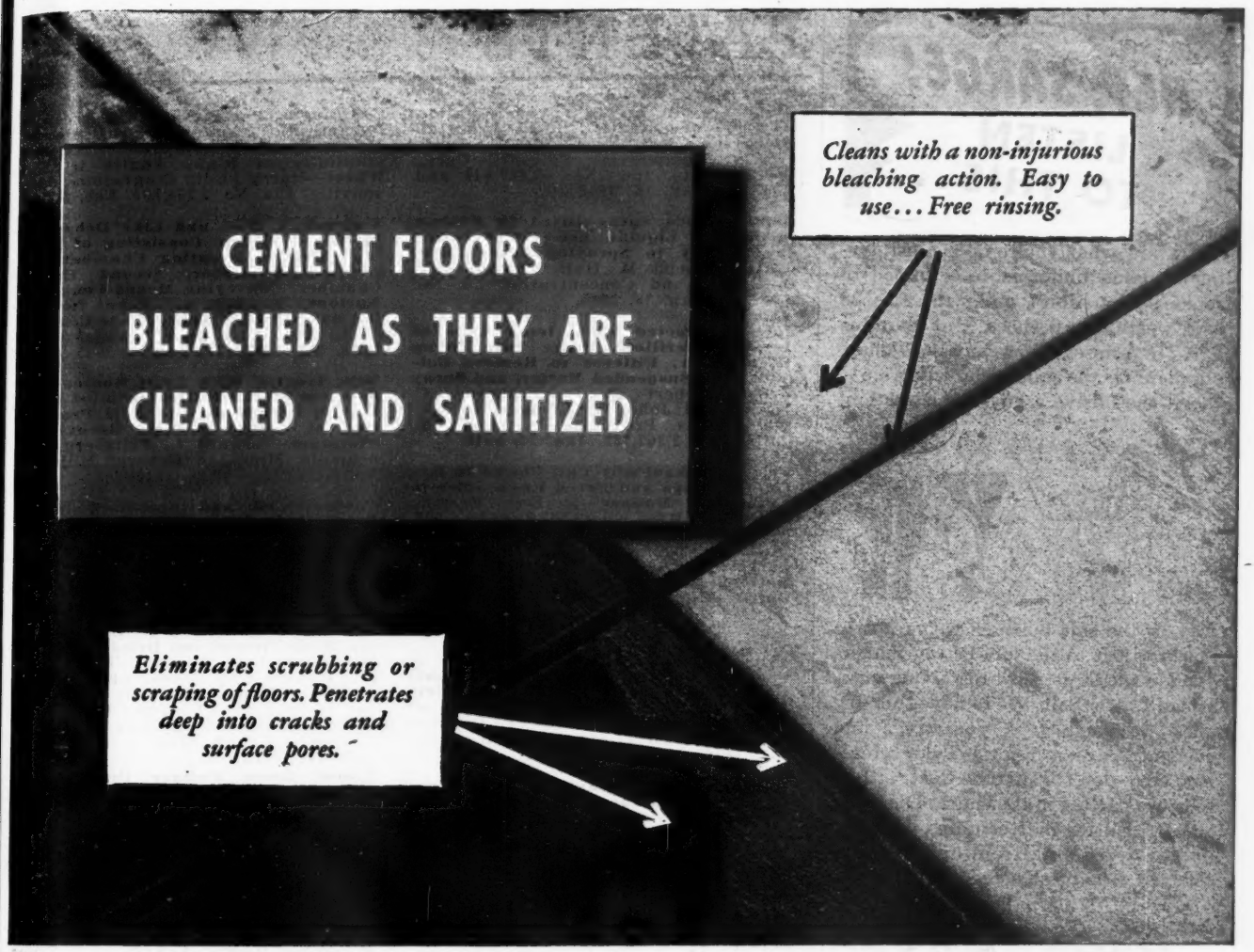
BUYERS GUIDE FOR SURPLUS PROPERTY. Surplus War Property Administration. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents. This gives a list of government selling agencies, types of property and addresses of sales offices.

SALINE SOILS—Their Nature and Management. By O. C. Magistad and J. E. Christiansen. Department of Agriculture Circular No. 707. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.

THE SAMPLING AND ANALYSIS OF GASES IN CANS OF DEHYDRATED VEGETABLES. Western Regional Research Laboratory, Albany, Calif. Mimeographed AIC-47. Free. Describes apparatus for sampling and analysis.

UNION AGREEMENTS IN THE CANNED FRUIT AND VEGETABLE INDUSTRY. Bureau of Labor Statistics, Bulletin No. 794. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents. A summary of labor contracts prepared in the Industrial Relations Division of Bureau of Labor Statistics.

PLACE AND SEASON EFFECTS ON YIELDS AND STARCH CONTENT OF 38 KINDS OF SWEET POTATOES. By Victor R. Boswell and associates. Department of Agriculture, Circular No. 714. Available from Superintendent of Documents, Washington 25, D. C. Price, 5 cents.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Eliminates scrubbing or scraping of floors. Penetrates deep into cracks and surface pores.

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Turco modern chemistry has produced in Aktiv a specialized cement floor cleaner that is exceptionally effective. Not only does it speedily and thoroughly emulsify grease and oil, it penetrates deep into cracks and surface pores, ordinarily uncleanable. The dirt comes to the surface where cold water will flush it away without trace. But that's not all: Turco Aktiv also sanitizes as it cleans, whitens cement with a non-injurious bleaching action.

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Yes, it's just as exacting for a salt producer to remove over-sized and under-sized salt crystals . . . as for the "top kick" to take care of his over-sized and under-sized rookies. If we know the average "top kick," however, he gets results and so do we at Diamond Crystal. That's why you can be sure of clean screening whenever you specify Diamond Crystal. Take your choice of grade or grain—it's tops by actual tests!

NEED HELP? HERE IT IS!

If *you* have a salt problem, let our Director of Technical Service help! Just address him in care of Diamond Crystal Salt, Dept. J-2, St. Clair, Michigan.

DIAMOND CRYSTAL
ALBERGER PROCESS **SALT**

PATENTS

Riboflavin Recovered From Solution Having Concentration of at Least 20 Micrograms Per Ml.—George E. Hines, Jr., to Commercial Solvents Corp., Terre Haute, Ind. Nos. 2,367,644 and 2,367,646. Jan. 16, 1945.

Liquid Foods Spray Dried in System in Which Liquids are Concentrated Preparatory to Spraying Into Dehydrater—Joseph M. Hall, Chicago, Ill., to Drying and Concentrating Co. No. 2,367,770. Jan. 23, 1945.

Juice Extracted From Inner Cells of Lemon, Sterilized, Made Into Sirup With Sugar, Filtered to Remove Colloidal and Suspended Matter, and Spray Dried—Herbert T. Leo, Clarence C. Taylor and John W. Lindsey, to Mutual Citrus Products Co., Anaheim, Calif. No. 2,367,789. Jan. 23, 1945.

Fruits Mechanically Cut, Placed in Extraction Cups and Freed From Juice in Automatic Manner—Herbert Fromm, Hamburg, Wis. No. 2,367,859. Jan. 23, 1945.

Carbonated Beverages Under Pressure Bottled Against Counter Pressure in Bottle—Robert J. Stewart, to Crown Cork & Seal Co., Inc., Baltimore, Md. No. 2,367,899. Jan. 23, 1945.

Yeast Grown at Progressive Rate to Promote Assimilation of Alcohol Formed by Yeast as Well as Complete Fermentation of Sugar Content of Wort—Marcel Celestin-Honoré Deloffre, Toorak, Victoria, Australia. No. 2,367,931. Jan. 23, 1945.

Bakery Doughs Leavened by Mixture of Lactose-fermenting and Baker's Yeasts—Harold H. Browne, Arlington, Va., to People of U.S.A. No. 2,367,994. Jan. 23, 1945.

Oil-and-fat-containing Material Agitated During Heat Treatment at Approximately 100 Deg. C. During Addition of Water Solution of Surface-tension-lowering Agent to Promote Upward Flow of Oil and Fat for Ultimate Separation by Layering—Joseph Charles Kernot, Mayfield, near Tunbridge Wells, and Victor Silberstein, Kensington, London, England. No. 2,368,028. Jan. 23, 1945.

Liquid Coffee Extract Made From Mixture of Finely Ground Roasted and Flaked Roasted Coffees—Clinton W. Carter, Allison Park, Pa. No. 2,368,113. Jan. 30, 1945.

Yeast Dried to Have 6.5 Percent Moisture Content, Ruptured Cell Walls, Stabilized Glutathione Content and pH Value of 4 to 5—Roland W. Selman, Jr., Kansas City, Kans., and Homer S. Myers, Kansas City, Mo., to Campbell-Taggart Research Corp., Kansas City, Mo. No. 2,368,384. Jan. 30, 1945.

Gelatine of Modified Composition Recovered From Concentrated Water Solution After Addition of Buffer Such as Sodium, Potassium or Ammonium Salts of Citric and Tartaric Acids—Clarence C. Zeigler, to Industrial Patents Corp., Chicago, Ill. No. 2,368,393. Jan. 30, 1945.

Meat Packaged in Rubber Hydrochloride Casing So As to Insure Absence of Bacteria-propagating Air Spaces in Sealed .Package—James A. Baker, Shorewood, Wis., to Milprint, Inc., Milwaukee, Wis. No. 2,368,398. Jan. 30, 1945.

Starch Made From Wheat Grains Without Conglomeration of Gluten Into Plastic State—Cecil T. Langford and Richard L. Slotter, Peoria, Ill., to Secretary of Agriculture, U.S.A. No. 2,368,668. Feb. 6, 1945.

Oils and Fats Deordorized in Continuous Manner in Atmosphere of Inert Gas Flowing Countercurrent Through Primary Distilling Zone—Alan Porter Lee, Madison, and Walter Gray King., Jr., Montclair, N. J. No. 2,368,669. Feb. 6, 1945.

Fruit Juices Mechanically Extracted in Unit Consisting of Feed Wheel With Continuous Peripheral Fruit-receiving Pocket and Annular Fruit-pressing Mechanism Rotatable About Axis Substantially at Right Angles to Feed Wheel—Harry Philip Bingheimer, Jacksonville, Fla. No. 2,368,800. Feb. 6, 1945.

Vegetables, Fish and Like Dehydrated in Closed System Consisting of Freezing Chamber, Heating Chamber, Centrifugal Separator, Second Heating Chamber, Conveying Means Connecting Various Chambers and Means for Cooling and Heating Appropriate Chambers—Valdimar Einarsson, Reykjavik, Iceland. No. 2,368,811. Feb. 6, 1945.

Milk Treated With Inert Non-condensible Gas to Form Dispersion of Gas in Liquid, Preparatory to Acid Precipitation of Casein and Its Recovery by Flotation—Edward L. Fritzberg, Minneapolis, Minn., to General Mills, Inc. No. 2,368,919. Feb. 6, 1945.

Concentrated and Sterilized Tomato Paste Made From Pulp Without Substantial Impairment of Color and Body—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,368,945. Feb. 6, 1945.

Legume Foliage Processed by Enzymic and Bacterial Action to Develop Aroma, Heat Treated and Dried for Potable Beverage Use—William R. Graham, Jr., Kansas City, Kans., and Clark W. McCarty, Kansas City, Mo., to American Dairies, Inc., Kansas City, Mo., and Quaker Oats Co., Chicago, Ill. No. 2,369,041. Feb. 6, 1945.

Cereal Grass Foliage Processed By Enzymic and Bacterial Action to Develop Aroma, Heat Treated and Dried for Beverage Use—William R. Graham, Jr., Kansas City, Kans., and Clark W. McCarty, Kansas City, Mo., to American Dairies, Inc., Kansas City, Mo., and Quaker Oats Co., Chicago, Ill. No. 2,369,042. Feb. 6, 1945.

Jam and Jelly Mix Made to Consist of Rapid-set Pectin, Anhydrous Dextrose, and Anhydrous Solid Content of a Corn Sirup and Sterile Lemon Juice Mixture—Herbert T. Leo, Clarence C. Taylor, and John W. Lindsey, to Mutual Citrus Products Co., Anaheim, Calif. No. 2,369,059, Feb. 6, 1945.

Casein Precipitated So As to Form Small Tender Particles When Dried—Edward J. Wendt, Elroy, Wis., to Hercules Powder Co., Wilmington, Del. No. 2,369,095. Feb. 6, 1945.

Dextrose Made in Crystalline Form in Rotating-drum Unit—Albert T. Harding, Maywood, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,369,231. Feb. 13, 1945.

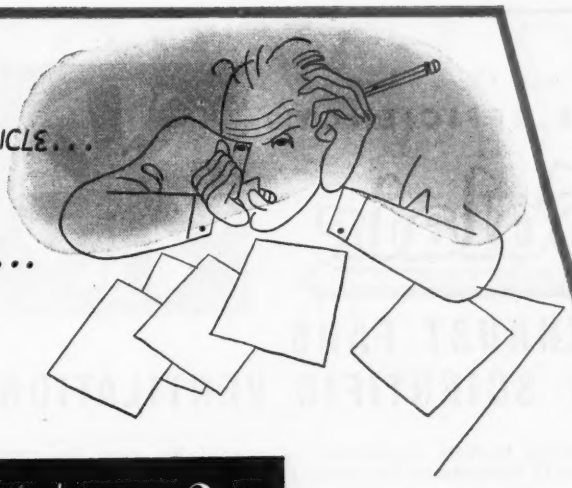
Link Sausages Skinned in Continuous Manner by Mechanical Means—Philip Martin, Tarzana, Calif. No. 2,369,360. Feb. 13, 1945.

Mayonnaise and Salad Dressings Made in Multiple-cycle Circulatory Operation—Ernest E. Lindsey, to A. T. Case Co., Los Angeles, Calif. No. 2,369,744. Feb. 20, 1945.

Bread Loaf Mechanically Sliced, Subdivided Into Two Parts, Separately Wrapped, Brought Together to Have Loaf-forming Alignment, and Given Overwrap to Make Unit Package—Gustav C. Papendick, deceased, to Elizabeth Papendick, University City, Mo. No. 2,369,753. Feb. 20, 1945.

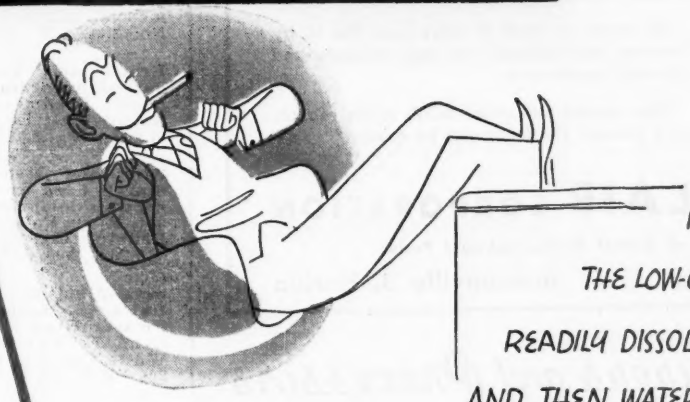
Food Heated to Sterilizing Temperatures, Packaged While Steaming Hot In Flexible-walled Impervious Container With Substantial Headspace, and Hermetically Sealed While Hot and Sterile So That, Upon Cooling, Walls of Container Will Collapse and Protect Contents—Harry F. Waters, New York, N. Y. No. 2,369,765. Feb. 20, 1945.

Custard-like Milk Mix Made to Consist of Milk and Pectin Which Will Jell Independently of Sugar Content—Aksel G. Olsen and Ellis F. Fehlberg, Battle



THIS PRODUCT NEEDED WATER AS A VEHICLE...
BUT SOME OF ITS INGREDIENTS
WERE NOT SOLUBLE IN WATER...

is this your story?



PROPYLENE GLYCOL—
THE LOW-COST MUTUAL SOLVENT—
READILY DISSOLVES MANY MATERIALS...
AND THEN WATER DILUTION IS EASY.

Dow Propylene Glycol, n.f.

Here are the facts of a tough case. PROBLEM: How could water serve as the vehicle . . . when some of the other ingredients just wouldn't dissolve in water? ANSWER: (it proved simple and economical) Dow Propylene Glycol, N. F., first dissolved those stubborn materials . . . brought them into a solution that mixed easily with water in the desired proportion.

When water-insoluble flavors, pharmaceuticals, or oils complicate your process, Propylene Glycol may be the product for you. It's low in cost, permitted for internal use, and an excellent mutual solvent for many substances and water.

Dow Propylene Glycol, of National Formulary quality, does other jobs, too . . . checks mold growth, retards drying out, improves physical properties, acts as an antifreeze. See what this multi-purpose material can do to cut your costs and improve your product. Send for Dow's free booklet today!

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Increase . . .
EMPLOYEE EFFICIENCY

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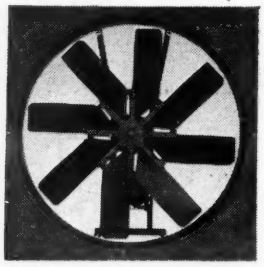

EXHAUST FANS
for SCIENTIFIC VENTILATION

Keeping workers comfortable is one of the most important factors in maintaining an efficient working organization. If the change of air is not sufficient for comfort, the amount of work an employee can perform in a given time is seriously affected.

Manufacturers, processors, packers and other handlers of food products, whether or not directly engaged in war contracts, are authorized under present government regulations to assign high priority ratings to orders for Coolair Fans.

CATALOG PAGES
Fan models, dimensions and performance data can be found in SWEET'S ASHVE GUIDE and ELECTRICAL BUYER'S REFERENCE

Get more workers to work and like it, by "breeze conditioning" for cool comfort and healthful ventilation.

Plan ahead and order NOW while reasonably prompt shipment can be made.

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"Pioneer Manufacturers of V-Belt Drive Exhaust Fans"
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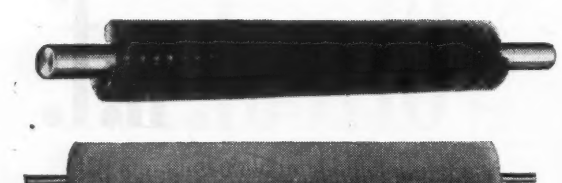
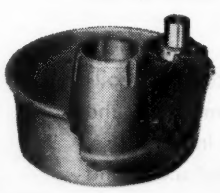
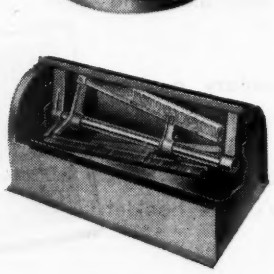
Food Manufacturers and Processors

FULLERGRIPT brushes are made to eliminate laborious hand labor or to do a better cleaning job than brushes of any other construction. With permanent metal arbors, brushes are easily refilled. Special brushes have been designed for many particular operations in the food industry.

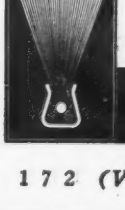
What cleaning job now done in your plant do you wish accomplished by faster brushing means?







WIRE FILLED CYLINDER BRUSHES
BRISTLE CYLINDER BRUSHES
BRAN DUSTER BRUSHES
ANGEL CAKE PAN BRUSHES
SIFTER BRUSHES, AND OTHERS



THE FULLER BRUSH COMPANY
INDUSTRIAL DIVISION, 3592 MAIN STREET, HARTFORD 2, CONN.

Creek, Mich., to General Foods Corp., New York, N. Y. No. 2,369,846. Feb. 20, 1945.

Volatile Water-immiscible Flavoring Material Prepared to be Stable in Dry Form—Aksel G. Olsen, Summit, and Edward Seltzer, Teaneck, N. Y., to General Foods Corp., New York, N. Y. No. 2,369,847. Feb. 20, 1945.

Citrus Fruits Flamed to Char Outer Skin and Eliminate Oil Content Preparatory to Removal of Skin—Herbert Edward Greenlaw, Auburndale, Fla. No. 2,369,891. Feb. 20, 1945.

Eggs Candled in Crate-filler Lots in Mechanical Unit Designed to Give Simultaneous Passage of Light Through Each Individual Egg—Ely Bramson, to Bramson Manufacturing Co., Inc., Chicago, Ill. Nos. 2,370,121 and 2,370,122. Feb. 27, 1945.

Dry Finely Divided Starch Conversion Sirup Solids Dissolved to Form Concentrated Aqueous Solution—Benjamin F. Buchanan, Leonia, N. J., to American Maize-Products Co. No. 2,370,123. Feb. 27, 1945.

Cereal Mash Fermented With Clostridium acetobutylicum in Presence of Small Quantity of Sodium Sulphite to Give Uniform, Relatively High Riboflavin Content — David A. Legg and Samuel C. Beesch, to Publicker Commercial Alcohol Co., Philadelphia, Pa. No. 2,370,177. Feb. 27, 1945.

Fruits and Vegetables Mechanically Sorted According to Size—Ernest Raphael Sandmeyer, to Fruit Packers Supply & Equipment Co., Yakima, Wash. No. 2,370,262. Feb. 27, 1945.

Zein and Heat-gelatinized Tapioca Starch Used as Constituents in Paper-coating Composition—Charles W. Stewart, River Forest, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,370,268. Feb. 27, 1945.

Food-filled Containers Made to Have Uniform Headspace by Mechanical Presser Head Preparatory to Sealing—Lynn E. Davies, Park Ridge, Ill., to White Cap Co., Chicago, Ill. No. 2,370,292. Feb. 27, 1945.

Canadian Patents.

Containers Filled With Food for Further Processing Head-spaced by Mechanical Means to Aid in Vacuum Sealing and Avoid Breakage During Retorting—Lynn E. Davies, Park Ridge, Ill., to White Cap Co., Chicago, Ill. No. 424,152. Nov. 28, 1944.

Doughs Baked in Traveling Tray Oven During Passage Through Infrared Ray Heated Zone—Franklin Henry Wells, Ridgeway, N. J., to American Machine & Foundry Co., New York, N. Y. No. 424,913. Jan. 9, 1945.

Bakery Products Iced in Continuous Manner During Passage Over Rotary Drum Carrying Layer of Icing Material—William H. Fredrickson, to LeConie Stiles, Seattle, Wash. No. 425,141. Jan. 16, 1945.

Solid Constituents of Expressed Juices of Fruits, Vegetables and Mixtures, Free From Naturally Occurring Pectins, Put Into Form of Hard Tablet Having Moisture Content Not to Exceed 2 Percent—John A. Bruce, to Bruce's Juices, Inc., Tampa, Fla. No. 425,291. Jan. 30, 1945.

Hulled Rice Grain Given Vitamin B₁ Fortification by Coating With Polishing Sirup—Max Frank Furter, Upper Montclair, N. J., to Hoffman-LaRoche, Lt., Montreal, Quebec, Canada. Nos. 425,321 and 425,322. Jan. 30, 1945.

Processed Cheese, Flowable When Hot, Packaged in Container Formed From Sheet Material Coated With Adherent, Continuous, Flexible Thermoplastic to Give Intimate But Peelable Bond With Cheese When Cooled—Allen Abrams, Donald W. Davis, George W. Forcey, Wausau, George G. Rumberger, Neenah and Charley L. Wagner, Menasha, to Marathon Paper Mills Co., Rothschild, Wis. No. 425,337. Jan. 30, 1945.

FOOD TECHNOLOGY
NEW DISCOVERIES AND INVENTIONS

BAKING

Peanut Flour Bread

PEANUT FLOUR, the product left after the oil is extracted from hulled peanuts under sanitary conditions, is an excellent source of proteins and vitamins. The average results of analysis of three commercial flours were, in per cent:

Moisture	7.5
Protein	58.0
Fat	9.6
Ash	3.7
Crude fiber	2.1
Total sugar as sucrose	7.3
Other carbohydrates (by difference)	11.8
Calcium	0.074
Phosphorus	0.556
Iron	0.0033

The peanut flour can be used in amounts up to 40 percent of the total flour in making bread, and its use up to 20 percent is recommended. It is best used with clear wheat flour, because of the high percentage of gluten in this. Peanut flour lacks gluten.

In the experimental loaves, bread made by the straight-dough method was slightly better than that made by the sponge method.

Substitution of peanut flour by weight for half of the wheat flour gave satisfactory cookies, biscuits, muffins and cakes.

Digest from "Use of Peanut Flour in Baking," by E. Grewe, Food Research, vol. 10, 28-41, January-February, 1945.

DAIRY

Milk-fat Dispersion

BASED on the principle that for a given separator of uniform performance the butterfat content of skim milk is an index of the degree of fat dispersion in milk, a study of agitated cheese milk disclosed an almost linear relationship between agitation and the degree of fat dispersion within the range studied.

The increase in fat—aqueous interface is approximately seven-fold for 15 minutes of vigorous agitation in a churn at 86 deg. F. This increase is sufficient to account for the increase in lipase action by agitation of the milk. In turn, the increase in lipase action will account for the presence of more free fatty acids in raw-milk cheddar cheese. It is the lower free fatty acids that impart an objectionable flavor to the product.

The use of a cream separator which gives uniformity of skimming, in conjunction with the normal butyl alcohol-Babcock test, has proved itself simple and reliable in studying the degree of fat dispersion in milk, and its application is being extended to other problems in dairy science.

Digest from "The Degree of Fat Dispersion in Cheese Milk and Its Relation to the Mechanism of Increased Lipase Action in Agitated Milk," by I. Hlynka, E. G. Hood and C. A. Gibson, Journal of Dairy Science, vol. 28, 79-83, January, 1945.

FOOD CHEMISTRY

Moisture Determination

CHEMICAL determination of water by the use of the complex Fischer reagent (pyridine, methanol, sulphur dioxide and iodine) can advantageously be applied to cereals and cereal products. The Fischer reagent is specific for water. It can be used with a wide variety of materials.

The reaction is suited to electrometric measurement. The Fischer reagent is added to a weighed sample until the presence of an excess is indicated by the appearance of a brown color. The excess is then back-titrated with a standard solution of water in methanol. The potential change at the end point is definite, while the color change is a gradual progression from brown through reds to bright yellow. Results are obtainable in from 10 to 60 minutes.

For cereals the critical factors are time of contact with the reagent and the particle size of the sample. The time of contact for maximum water extraction and the appropriate fineness of the sample, differing with different materials, must be determined experimentally.

Moisture determinations on a variety of substances, representing a range from 1 to 80 percent in water content, showed close agreement with the oven test values except in the case of wheat flour and corn flour, for which standard AOAC oven values may be too low.

Digest from "A Preliminary Investigation of the Application of the Karl Fischer Reagent to the Determination of Moisture in Cereals and Cereal Products," by R. H. Fosnot and R. W. Haman, Cereal Chemistry, vol. 22, 41-49, January, 1945.

Soya in Meat

SOYBEAN FLOUR in meat products can be determined chemically by isolation of the characteristic protein of the soybean, glycinin. The method is time consuming but otherwise acceptable. It requires no special apparatus or skill.

A method that is specific for soybeans is based on serum reactions. An antiserum is developed by graded injections into rats of a sterilized soya protein solution prepared by extraction with a sodium chloride, sodium bicarbonate and phenol solution. The details of developing the antibody serum and preparing standard comparison tubes are given as they are used at the Fifth Service Command Laboratory, Veterinary Corps, at Fort Benjamin Harrison, Indiana.

Preparation of the first serum is slow. But if a large number of determinations must be made, a supply of serum can be produced continuously, with little effort. Results are accurate and reproducible.

Digest from "Determination of Soybean Flour in Meat Products," by M. W. Hale, Food Research, vol. 10, 60-65, January-February, 1945.

DEHYDRATION

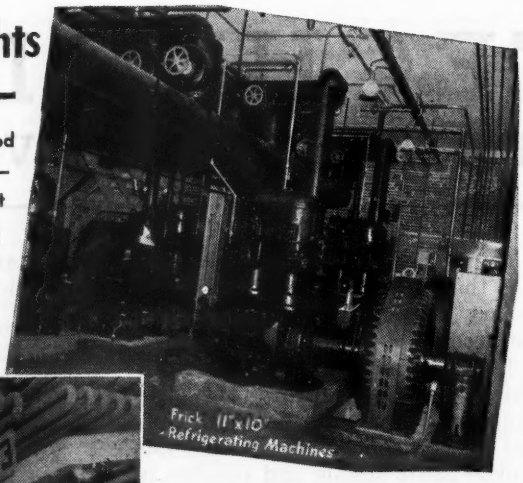
Carotene Protection

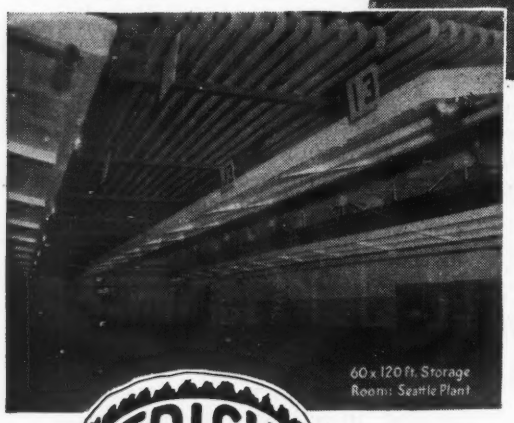
IN dehydrated feedstuffs, neither acids, alkalies nor antioxidants were effective in maintaining carotene levels during storage. The list of additions tried on alfalfa, oatmeal, carrots and sweet potatoes included sodium thiosulphate, sulphuric acid, glucoascorbic acid, d-isoascorbic acid, sodium isoascorbate, guaiac, citric acid, tartaric acid, phosphoric acid, sodium bicarbonate, disodium phosphate, urea, ammonia, alpha-tocopherol and hydroquinone.

When stored in slices, dehydrated

An Army Still Fights on its Stomach—

As evidenced by the two great food storages—largest in the Northwest—recently built for the U. S. Army at Seattle and Auburn, Wash. Each measures 458 ft. long by 154 ft. wide, and holds 5,625,000 lb. of food, mostly frozen. Cost per plant, over $600,000.





Frick Refrigeration cools both these great storages, each of which has 4 ammonia compressors, 4 brine coolers, thousands of feet of piping, etc. Installation by the Lewis Refrigeration and Supply Co., Frick Sales Representatives at Seattle.

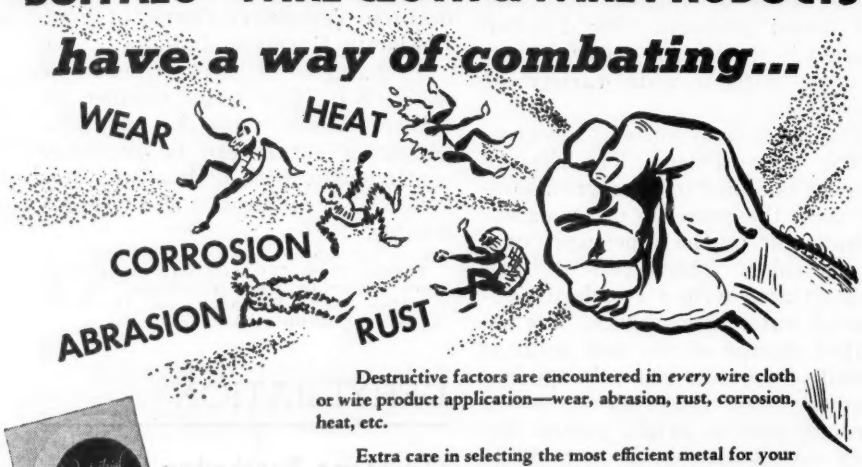
For that important air conditioning, ice making or refrigeration job of yours, look to

FRICK COMPANY
Waynesboro, Penna.

TRADE FRICK MARK **Refrigeration**

"BUFFALO" WIRE CLOTH & WIRE PRODUCTS

have a way of combating...



Destructive factors are encountered in *every* wire cloth or wire product application—wear, abrasion, rust, corrosion, heat, etc.

Extra care in selecting the most efficient metal for your own conditions can either *completely eliminate*, or at least *effectively combat* these factors.

Always check first with "Buffalo Wire" for wire cloth, baskets, riddles, guards, enclosures and other wire products. Here, all ductile metals are woven to order and many are carried in stock. This coupled with an extensive line of weaves, mesh and wire sizes assures you maximum opportunity to combat adverse conditions.

Many everyday questions are answered in new Industrial Wire Cloth Catalog No. 12. Sent on request.

MANUFACTURER OF ALL TYPES OF WIRE CLOTH FOR OVER 76 YEARS

Buffalo WIRE WORKS CO., INC.
ESTABLISHED 1869 AS SCHEELER'S SONS

452 TERRACE BUFFALO 2, N. Y.

sweet potatoes lost only 5 percent of their carotene in six months at room temperature in the dark. But the flour prepared by grinding the slices before storage lost 65 percent in the same time. When sweet potato flour is wanted, the dehydrated slices should be stored, to be ground just before use.

Carrots dehydrated and stored in dice lost no carotene during the first three months and only 25 percent during a second three-month period. But when the outer surface was broken by compressing the carrots into 1-lb. blocks, the loss was 66 percent in six months.

Digest from "Studies on the Stabilization of Carotene in Dehydrated Feeds and Foods," by R. C. Mills and E. B. Hart, Journal of Dairy Science, vol. 28, 1-13, January, 1945.

ENGINEERING

Heat Transfer

PHYSICAL properties that affect the value of a fluid as a heat-transfer medium include specific heat, viscosity, density, thermal conductivity and possibly vapor pressure. The latter only enters into consideration in the overall design of the equipment. The energy expended in accomplishing the heat exchange is the important feature.

A method is presented which compares fluids on the basis of the energy input required for the same heat transfer from the fluid to the pipe surface for a unit of area [film coefficient = B.t.u./(hr.) (sq. ft.) (°F.)], or on the basis of heat transfer from the fluid for the same expenditure of energy. In the first case the fluid having the smallest energy requirement is to be preferred, in the second the fluid with the higher coefficient is preferable.

The mathematics of expressing relationship between power loss per unit of surface, that is, the energy required for circulation of the fluid per unit of inside area of the pipe, and the coefficient of heat transfer between fluid and surface are too involved for presentation here, but the relationship is derived in terms of the diameter of the pipe and an expression involving the density, specific heat, thermal conductivity and absolute viscosity of the fluid.

In the region of smooth flow, the log-log curve for heat transfer vs. energy consumed in circulation rises as a straight line with slope 1/6 to a value determined by the critical Reynolds number for streamline flow, then there is

POSTWAR PRIMER OF PROTECTION

B is for Blueberries

kept plump, tasty and juice-filled from bush to table in **PLIOFILM** — because it seals moisture *in!*

and Bearings, too

kept rust- and corrosion-free, and ready to roll in **PLIOFILM** — because it seals moisture *out!*

Yes, there are two big reasons why many kinds of fine merchandise will be packaged in **PLIOFILM** after Victory. ★ You see, **PLIOFILM** is the most efficient transparent wrapping material known for keeping moisture in its place — *in*, or *out*. ★ One proof of that is the fact every American military aircraft engine is kept sealed in **PLIOFILM** until used. No other packaging proved equal to this difficult moisture-proofing job. ★ That is why no **PLIOFILM** is now available for normal uses, safeguarding fine foods, drugs, tobaccos and other moisture-sensitive products. ★ But smart manufacturers everywhere are already planning their postwar **PLIOFILM** packages, to bring the public their wares at peak of quality. For information write: Pliofilm Sales Dept., Goodyear, Akron 16, Ohio.

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THE GREATEST NAME IN RUBBER

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Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.
The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by
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Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton) Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.

YARWAY Spray Nozzles
INVOLUTE TYPE FOR CONE-SHAPED SPRAY
for WASHING • RINSING • COOLING • HUMIDIFYING
Get the most out of your Spraying Equipment without unnecessary power or liquid waste.
Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute type producing a fine cone-shaped spray with minimum energy loss, and Yarway Fan type producing a flat, fan-shaped spray with time-saving slicing action for cleaning.
Wide range of standard sizes and capacities. Cast or machined from solid bar stock.
Many thousands in use. Write for literature.
YARNALL-WARING CO., 127 Mermaid Ave.
Philadelphia 18, Pa.
FAN TYPE FOR FLAT SLICING SPRAY

an abrupt rise in the value through the region of critical flow conditions. It then extends as a straight line with slope 2/7 from the critical value for turbulent flow. In other words, not only is the heat exchange value higher after establishment of turbulent flow, but the increase for each increment of energy expended in circulating the fluid is also greater.

Critical examination of the conditions existing under different heat transfer setups indicates that when a liquid or gas is being heated by condensing steam, or when gas in tubes is heated by a condensing organic vapor, improvement may be gained by a greater expenditure of energy in forced circulation of the fluid being heated, while if liquid in tubes is to be heated by a condensing organic vapor, more forced circulation may not be worthwhile, due to the lower transfer efficiency of the organic vapor.

On the basis of published experimental conductivities, the authors rank a number of substances used for heat transfer, for conditions of turbulent flow at 86 deg. F. in pipes of 0.6-in. diameter, as follows:

1. Mercury
2. Water
3. Acetone
4. Ethyl ether
5. Methanol
6. Carbon bisulphide
7. Ethyl bromide
8. Toluene
9. Ethyl iodide
10. Ethanol
11. Chlorobenzene
12. Isopropanol
13. n-Butanol
15. Ethylene glycol
14. Isoamyl alcohol
16. Glycerol
17. Hydrogen (1 atm.)
18. Lubricating oil
19. Air (1 atm.)

In all cases, increase of the temperature increases the value of the fluid in heat transfer.

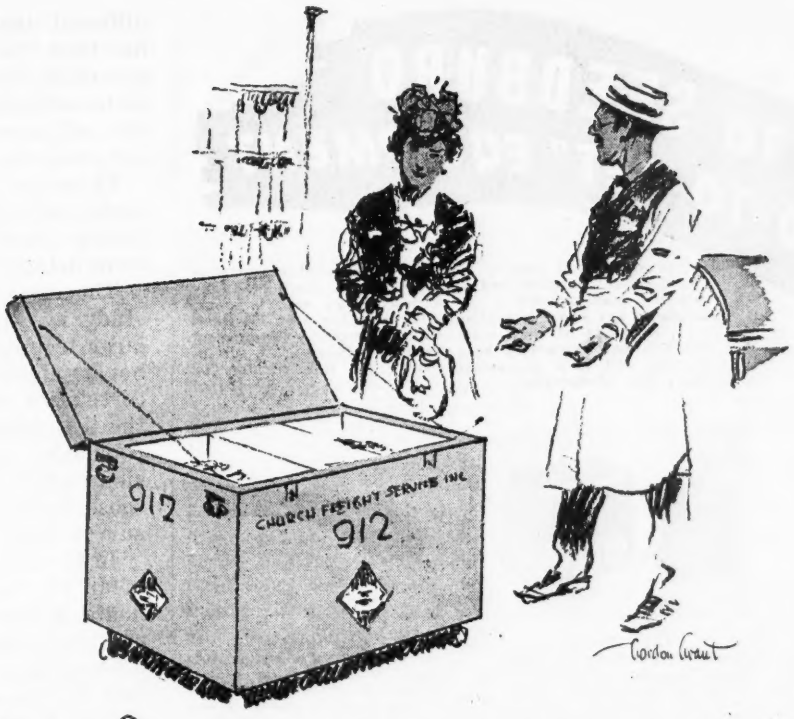
Digest from "New Basis Developed for Comparing Heat Transfer Fluids," by P. W. Parsons and B. J. Gaffney, Chemical & Metallurgical Engineering, vol. 52, 100-104, January, 1945.

RESEARCH METHODS

Nutrition Studies

ACCURACY in nutrition studies can only be attained by actual chemical analysis of the meals about to be eaten by the subjects. Researchers from the Nutritional Biochemistry Laboratories, Massachusetts Institute of Technology, have reported the method by which they obtained sample meals planned and prepared in the normal manner, representing a spread in age level and income groups.

One member of each participating family was selected as the subject. The project was discussed with the women of the families selected, and arrangements were made to collect one meal representative of breakfast, one lunch and one dinner, on



"That food has come a thousand miles, Lady, and it's FRESH as the minute it was put in the

CHURCH CONTAINER"

FRESH FOODS EVERYWHERE

Today's Perishables can be on All Postwar Tables

Church Containers to Perform a Miracle in Distribution

RAILWAY EXPRESS AGENCY

23,000 U.S. OUTLETS AVAILABLE TO YOU THROUGH RAILWAY EXPRESS AGENCY.

The bulk of the population of the United States live in communities too small to be served by refrigerated cars. Soon now you can sell them regularly by shipping your perishables direct in Church Containers by fast Express.

Sales executives of perishable food products, seeking to expand postwar markets will find a war-perfected transportation technique worthy of immediate study.

The Church Container service involving door to door delivery of perishable food by fast railway express to all points served by the Railway Express Agency, was in early operation when war came.

Immediately it was seized upon for transportation of blood from donation centers throughout the country to plasma processing laboratories. The demand for this type of service increased to the point where today over 90% of the Containers are working for the Red Cross.

As these Containers are released from war service, they are being again made available to processors of perishable food products. Foods shipped in Church Containers are held to within a three degree rise in temperature per day. Closely held refrigeration temperatures and speed in delivery are essential considerations in expanding the market for perishable products. These are the foundation of Church service.

Your nearest Railway Express Agency can supply you with complete details of the service.

Consult Your Nearest Railway Express Agency Representative

CHURCH FREIGHT SERVICE INC., 17 East 42nd Street, New York 17, N. Y.

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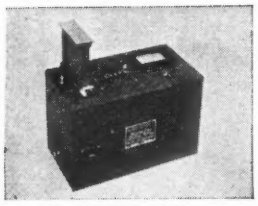
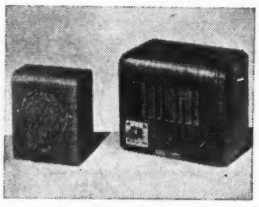


STEINLITE
The Steinlite one minute moisture tester is fast, accurate, easy to use. Economical to operate. Calibrated against official oven methods. Price $275.00. F.O.B. Atchison, Kansas. Immediate shipment.



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Inter-office communication system. Saves time, speeds production. You contact one or up to five persons while they remain at their work. Personnel can contact you. Master station $34.00. Sub-station, each $12.50.

CAR MOVER
Badger No. 221 Power King. Designed for heavy duty car spotting wherever two or more heavily loaded cars must be moved at one time. Castings are of alloy steel, handle of hardwood. Length 70 inches. Price $7.43.

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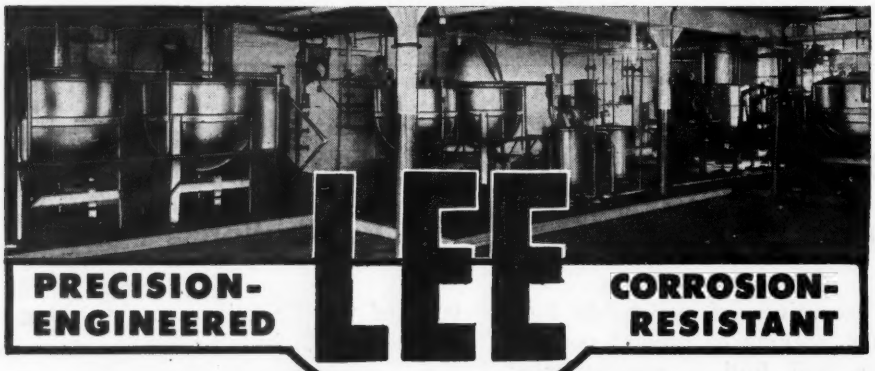
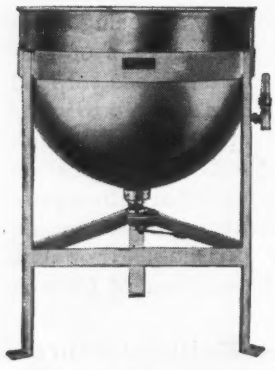
Formerly SEED TRADE REPORTING BUREAU FOUNDED 1912



PRECISION-ENGINEERED LEE CORROSION-RESISTANT KETTLES



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•Jacketed Kettles •Candy Kettles •Pedestal Kettles •Storage Tanks •Agitators •PulpTanks •"NOCOIL" Heating Tanks •Vacuum Pans •Plug Valves, and special equipment for specific needs.

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Fabricated from all types of commercial corrosion-resistant metals and alloys. Available for quick delivery under the new priorities are standard and specially designed types for every industrial application. Wire, phone or write LEE for the NEW advanced engineered equipment used in every processing application.

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different days, not otherwise specified than that they would be within a certain 8-week period. Each complete sampling was transported under refrigeration to the laboratory for analysis.

Thiamine, riboflavin, niacin, ascorbic acid, calcium and iron, as the factors most likely to be deficient, were determined.

The dietary analysis method of study is expensive and requires a large technical staff, so that it can not be applied to large groups. But correlation of the family diets in the test group with those of larger population groups permits conclusions which are more accurate than those based on a food-consumption survey alone.

In the test groups, only 7 percent of all the subjects received an adequate intake of all nutrients, according to the recommended dietary allowances of the Food and Nutrition Board, and only 21 percent received a protective intake of all nutrients.

Digest from "Study of the Nutritional Quality of Dietaries by Chemical Analysis," by E. E. Lockhart, R. S. Harris, E. W. Tapia, H. S. Lockhart, M. K. Nutter, V. Tiffany and A. H. Nagel, Journal of the American Dietetic Association, vol. 20, 742-46, December, 1944.

FATS AND OILS

Control Test to Use During Hydrogenation

INCREASE in viscosity of an oil during a drop in temperature is utilized in a purely mechanical test which permits close control of the hydrogenation of shortenings consisting of various proportions of animal and vegetable fats.

A plunger carrying a thermometer is moved up and down through a definite volume of the liquid fat or oil in a standard glass tube immersed in a constant temperature cooling bath. As the fat cools, crystals form, until a condition is reached where the friction in the semi-solidified mass is so great that the tube travels up and down with the plunger. When the tube stays with the plunger to a certain height, a buzzer is sounded and the operator reads the temperature. This value is called the "C" number in deg. C. It can be directly correlated with the penetration values. It is more sensitive than the Wiley melting point or the congealing-point determinations.

Reproducibility in the test is high, 0.3 deg. C. being the maximum variation found between the results of five different operators.

AN "OUNCE" OF Amercoat PREVENTION..

Prevention is better than cure . . . in safeguarding essential food processing equipment and plant structures from *Corrosion*.

Amercoat Plastic Coatings keep corrosion out—*before it starts*—saving you hours of maintenance and repairs, costly delays and premature replacements.

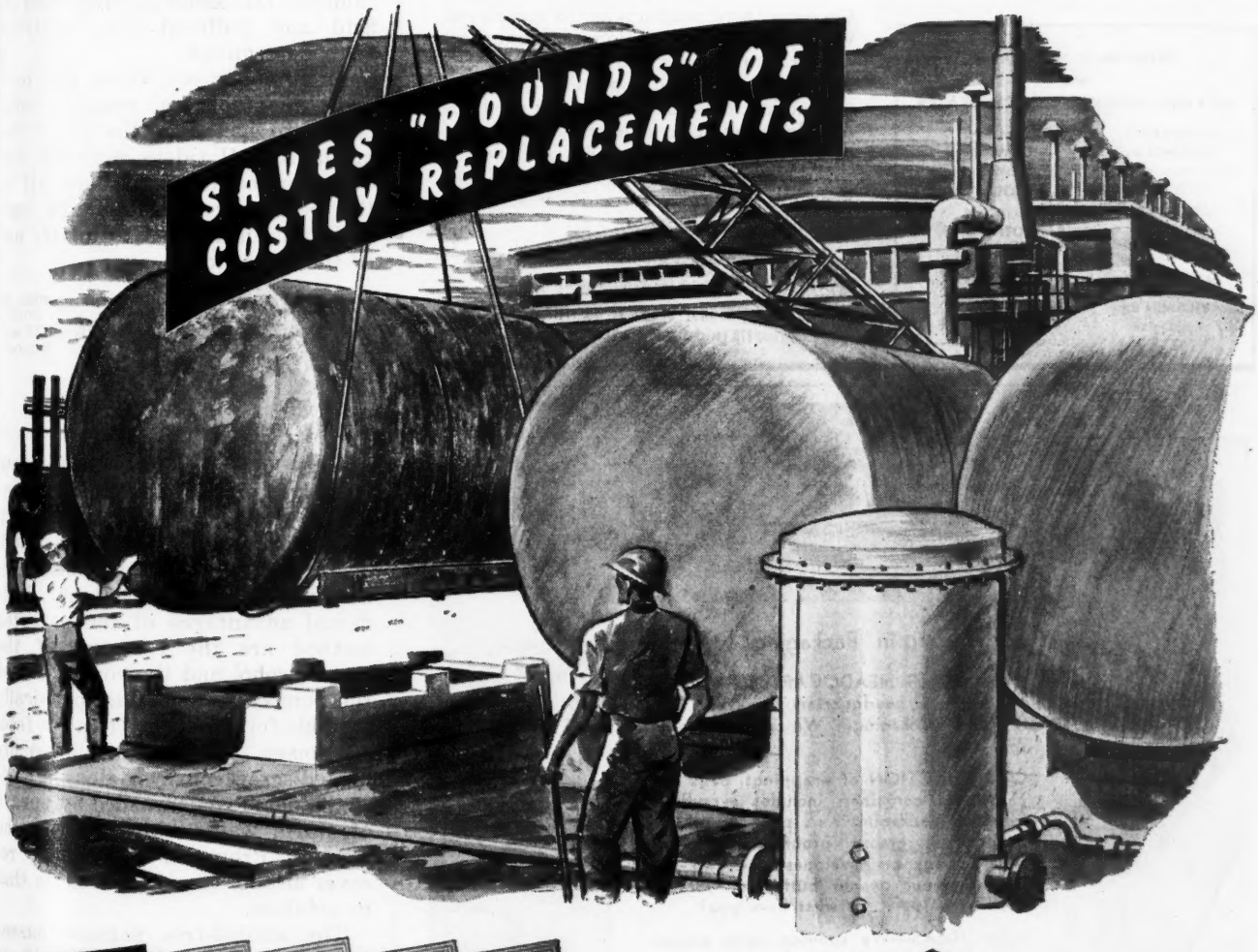
Easily cold-applied by brush or spray to metal, concrete or wood, Amercoat's tough plastic film is impervious to moisture, salts, acids and alkalies.

As a lining or exterior coating, Amercoat eliminates the constant hazard of corrosion on machinery, floors, walls, tanks, and other facilities.

Every ounce of Amercoat you use eliminates another cause of waste—the *contamination* of vital foods and beverages by the by-products of corrosion. This important product reduces spoilage of fruit and vegetable juices, butter, syrups, milk, sugar, meat, cheese, spirits, oils and other products.

Amercoat is odorless, tasteless, chemically inert. Its tough, smooth surface will not harbor bacteria, is not injured by caustic cleaning compounds and is quickly cleaned, making sanitation easier. Amercoat dries rapidly and requires no baking.

Write for literature pictured below



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Amercoat catalog . . . pictures and explains uses in all lines of business. Bulletins give complete list of technical features of Nos. 23, 33, 44 and 55 Coatings.

"A NAME EVERY FOOD MAN SHOULD KNOW"

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AMERICAN PIPE AND CONSTRUCTION CO.
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THREE WAYS *to improve your product with*
WINTHROP VITAMINS & MINERALS

1. **ENRICHMENT** of flour, white bread and rolls to government standards.

2. **RESTORATION** of natural vitamin value lost in processing of other foods.

3. **FORTIFICATION** with other vitamins essential to adequate nutrition.

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VITAMIN-MINERAL CONCENTRATES

CRYSTALLINE VITAMIN B_1 (Thiamine Hydrochloride)
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VITAMIN B_2 (Riboflavin)
CALCIUM PANTOTHENATE
NIACIN
NIACINAMIDE
"B-E-T-S" (Winthrop's brand of bread-enrichment tablets)
VITAMIN B_6 (Pyridoxine Hydrochloride)
"VEXTRAM" (Winthrop's brand of flour-enrichment mixture)

Give your food products added nutritional value through the addition of vitamins by one or more of the above processes. No matter what method applies best to your production, Winthrop is ready at all times to help with your enrichment, restoration, or fortification problem. For specific information, consult our TECHNICAL SALES SERVICE. No obligation. Price schedule on request.

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Everything in Packaging Materials

PACKAGING HEADQUARTERS—Our organization is headquarters for every type of food packaging. We are packaging specialists.

OUR SELECTION of wrappings, bags and cardboard containers includes everything for food packaging . . . plain or printed cellophane; grease proof papers . . . sheets, bags or envelopes . . . we can package your peanut butter, dehydrated foods, meats . . . or what have you?

NEW IDEAS—We sponsor novel presentations. We are sales minded—and create eye-catching packagings that move goods.

DEALERS—Some good territory still open.

PACKAGING DIVISION
E. W. Twitchell Incorporated
777 Public Ledger Bldg., Phila. 6, Pa.

Results are obtained rapidly, the entire test usually taking about five minutes.

The test is particularly useful in formulating standard shortenings when the raw materials vary.

Digest from "A Practical Analytical Method for Attaining Uniformity in Shortenings," by B. S. Harrington, F. B. Crist, A. A. Kiess and W. A. Jacob, Oil and Soap, vol. 22, 29-30, February, 1945.

MISCELLANEOUS

Sulphur Solutions

SULPHUR compounds have not been considered suitable for dairy plant sterilization, but in view of the search for substitutes to replace chlorine, the bacterial properties of acid and buffered SO_2 solutions were determined.

In all instances where the bacteria counts were reduced sufficiently to encourage the use of the agent, the pH values were low and corrosion occurred. Above pH 6, the percentage reduction of bacteria was insufficient to justify use of these solutions.

Digest from "Sulphur Compounds as Disinfecting Agents for Dairy Equipment," by W. S. Mueller, E. Bennett and J. E. Fuller, Journal of Dairy Science, vol. 27, 1007-9, December, 1944.

Tartrates

CONTINUOUS recovery of tartrate from grape pomace offers advantages which make such recovery economically feasible where batch operation would be uneconomic, according to a recent patent. Incidental advantages of the patented method are the recovery of the ethyl alcohol and the conversion of the pomace to a product physically suitable for fertilizer or cattle feed.

Pomace fed by an internally heated screw conveyor along a horizontal chamber is washed by sprays of warm water which remove the alcohol. Provision is made to recover alcohol vapors as well as that in solution.

The alcohol-free pomace passes through a trough where it is leached with a very dilute hydrochloric acid solution at 90 to 200 deg. F., the solution being recirculated until sufficiently high in tartrates.

Leached pomace is drained by being dragged by a short conveyor over a screen, under sprays of wash water, and then is passed through rolls to remove excess water.

Digest from U. S. Patent 2,359,929, issued October 10, 1944, to E. K. Metzner and assigned to Stauffer Chemical Co.

FORMULAS FOR FOODS

FORMULA NO. 526

Cranberry-Apple Pie

Cranberries	2 lb.
Apples, prepared	1 lb. 8 oz.
Fine granulated sugar	3 lb.
Water	1 lb. 8 oz.
Cornstarch	4 oz.

Directions

Grind 4 oz. of cranberries with a fine cutter, mix with 1 lb. of water and bring to a boil. Mix the starch with 8 oz. of water and add this to the boiling mixture. Cook until clear. Add 1½ lb. of sugar and bring to a good boil.

Chop the apples medium fine with a hand scraper. Blend the rest of the sugar with the chopped fruit, then add the cooked cornstarch-cranberry base and mix well. Cool before using.

Line 9-in. pie plates with a short flaky crust dough. Spread 1¼ lb. of the cooled filling in each pie. Wash the edges with water and make a lattice top. Trim the edge. Brush the top with an egg-milk wash if desired.

Bake at 420 deg. F.

Be sure that the cornstarch mixture is cooked until it is clear and that the filling is cool before it is put in the crust.

This formula can be used for reconstituted dried cranberries, adjusting the water.

Formula from Lever Bros. Co.

FORMULA NO. 527

Brown Betty Cake

Apple sauce	10 lb.
Raisins	5 lb.
Standardized invert sugar	2 lb. 8 oz.
Water	8 oz.
Molasses	3 lb.
Sugar	6 lb. 3 oz.
Shortening	3 lb.
Salt	4 oz.
Flour	10 lb.
Soda	3¼ lb.
Cream of tartar or other acid leavening	4 oz.
Cinnamon	2½ oz.
Nutmeg	1 oz.
Mace	1 oz.
Whole eggs	3 lb.
Baking powder	1¼ lb.
Reconditioned fruit cake crumbs	5 lb.

Directions

While stirring, bring to a boil the apple sauce, raisins, invert sugar and water. Add the molasses and 2¾ lb. of sugar. Stir until dissolved, then cool before using. Cream together the shortening, all the balance of the sugar and the salt. Sift 3 lb. of flour with the acid leavening and spices so that they are well blended, then add the dry mixture to the creamed shortening and sugar. Cream until smooth, then add the eggs slowly, continuing to cream. Add the cooled apple and molasses mixture, together with the reconditioned crumbs, then add the remaining flour and the baking powder.

Bake at about 370 deg. F.

Old fruit cake may be broken into small particles in several ways. One method is to mix the cakes until broken fine, using either a horizontal creamer or a vertical mixer with a paddle arm. The cake may be put through a food grinder or a chopping machine with whirling knives. The broken pieces may be softened to a smooth mush of cake batter consistency by adding water, milk or eggs. It is advisable to experiment to determine which works best with the crumbs available. Allow the crumbs to soak at least an hour before using. It is better to let them stand overnight, if possible. The amount of crumbs used may be varied.

The amount of baking powder depends upon the amount of crumbs, so if a different amount of crumbs is used, use baking powder in the proportion of 2½ oz. for 10 lb. of crumbs.

The flour should be of a high sugar carrying quality.

This cake may be finished with apple whip and nuts.

Formula from The Nulomoline Co.

FORMULA NO. 528

Apple Whip

Gelatine	2¼ oz.
Cold water	8 oz.
Egg whites	8 oz.
Standardized invert sugar	1 lb.
Corn sirup	2 lb.
Apple sauce	2 lb.
Icing sugar	4 lb.
Cinnamon	⅛ oz.

Directions

Soak the gelatine in water, then heat until fluid, which will be about 140 deg. F. Add this to the egg whites, stir in the invert sugar and corn sirup, then the apple sauce, sugar and cinnamon. Whip until light, fluffy and fairly stiff.

Use immediately.

Use between layers and as a frosting on Brown Betty Cake (Formula 527). This may be topped with nuts.

Formula from The Nulomoline Co.

FORMULA NO. 529

Butterscotch Cookies

Brown sugar	2 lb. 8 oz.
Emulsifying shortening	1 lb.
Salt	1 oz.
Whole eggs	1 lb.
Vanilla	¼ oz.
Pastry flour	3 lb.
Soda	¼ oz.

Directions

Cream the sugar, shortening and salt. Add the eggs and vanilla, creaming again well. Sift the flour with the soda and add.

Mold in long pieces about 1½ in. in diameter. Place in the refrigerator for several hours, then cut about ½ in. thick.

Bake at 350 deg. F.

Formula from the Experimental Bakery, Armour & Co.

FORMULA NO. 530

Soya Pecan Pie

Whole eggs	2 lb.
Enzyme-converted corn sirup	12 lb.
Brown sugar	1 lb.
High-fat soya flour	1 lb. 8 oz.
Salt	1 oz.
Water	3 lb. 4 oz.
Vanilla	1 oz.
Melted butter (optional)	2 oz.
Pecans	as desired

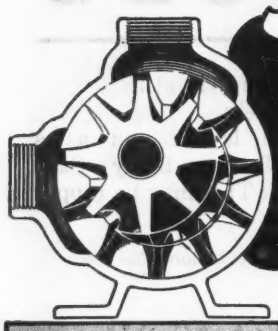
Directions

Beat the eggs, corn sirup, brown sugar, soya flour and salt together until thoroughly mixed. Add the water, vanilla and butter if used, stirring in well.

Fill into unbaked, shallow pie shells that have been allowed to dry and in which a liberal quantity of small pecan halves or broken pieces have been placed. Bake at 365 to 385 deg. F., depending on the size of the pie. This must be baked only until the filling starts to set. Overbaking will cause excessive shrinkage during cooling.

This is a suggested formula, only, and must be tested under the conditions in each plant.

Formula from A. E. Staley Mfg. Co.



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VIKING

IS THE LARGEST SELLING ROTARY PUMP IN THE WORLD

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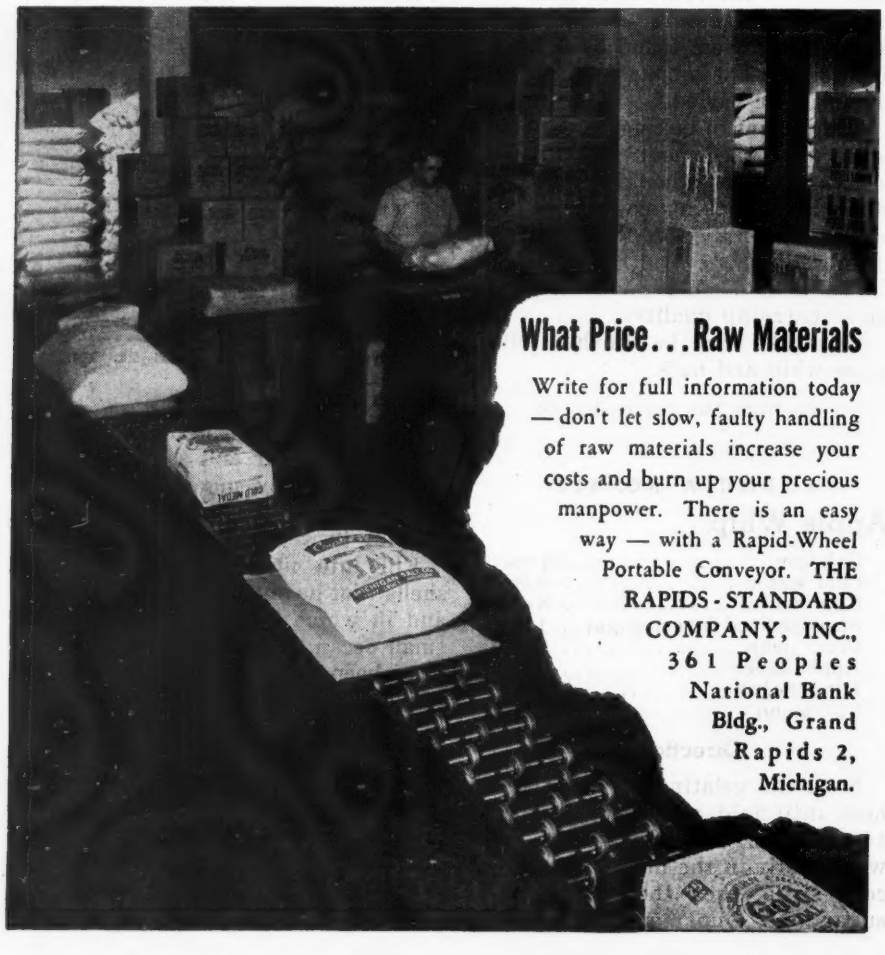

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Dehydrated Potato Quality

(*Continued from page* 94)

of quality with blanching treatment, we may use the data in Table II to show the effect of temperature on quality retention during storage. The average scores for the 6 samples stored at –30 deg. F. and 90 deg. F. are collected in Table III. The detrimental effect of the higher temperature of storage is evident for all four organoleptic factors.

Of the four quality factors studied, the one most sensitive to temperature was color. The color change at 90 deg. F. was very marked in the unreconstituted material, and was characterized by browning similar in appearance to material scorched during dehydration. Since most of the pigment was water-soluble, it was possible to study color in an objective manner by determining the percentage of light transmission in clarified water extracts of ground samples. The data in Table IV show that the color in the extract was much greater for samples stored at 90 deg. F., as indicated by the lower percentage of light transmission, than for those stored at the other temperatures. The change in color of the samples stored at room temperature, compared with the color of those stored at –30 deg. F., is surprisingly small in view of the marked effect of storage at 90 deg. F.

Although the color change at 90 deg. F. was least when the blanching time was in excess of 2 minutes, *this apparent effect of blanching time cannot be separated from the effect of variation in moisture content, and therefore it cannot be concluded that the blanching time was of importance.* The moisture content of the material immediately after dehydration ranged from 4.7 to 7.0 percent, and at 90 deg. F. increased over a 32-week observation period to 6.0 to 7.9 percent. In Table V it may be observed that a fairly high correlation exists between moisture content and light transmission in the water extracts of the material stored at 90 deg. F., *suggesting that the higher color in the samples blanched 1 and 2 minutes was due to their higher moisture content.* This relation between moisture content and the formation of water-soluble pigment has been noted in other experiments carried out at this Laboratory.

The results for retention of quality after storage at the different temperatures have emphasized the

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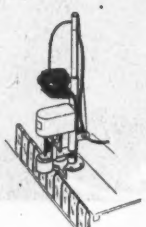

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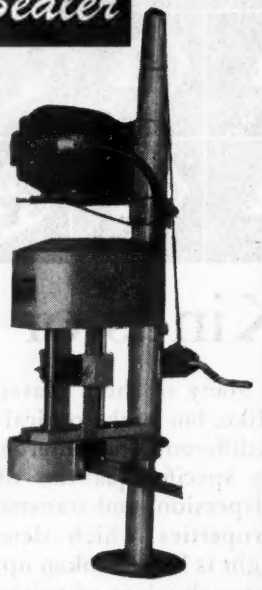

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importance of avoiding as much as possible temperatures above 70 to 80 deg. F. during storage and transportation of dehydrated white potatoes.

Commercially Dehydrated Potatoes

In addition to the results discussed above, four samples of commercially dehydrated potatoes reported to have positive peroxidase activity were stored at 90 deg. F. Tests showed that they were slightly positive in peroxidase. After 13 months of storage at 90 deg. F., all of the samples had become darker in color, a change typical of blanched dehydrated potatoes at this temperature even with peroxidase completely inactivated. After reconstitution, all samples yielded satisfactory products, indicating that slight residual peroxidase activity is of little, if any, significance with respect to retention of eating quality during storage at 90 deg. F.

In another experiment, nine samples of potatoes reported to have peroxidase activity were placed in storage at 90 deg. F. for eight months. Tests made when the material was received showed a range in relative peroxidase activity scores of 0 to 3 with guaiacol. Out of the nine samples, only three showed positive activity. By the benzidine method the peroxidase scores ranged from 1 to 5, indicating residual peroxidase activity in all samples. Organoleptic tests after eight months of storage at 90 deg. F. indicated a reduction in taste and flavor in all samples, but no significant change in color. The change in taste and flavor was in the nature of a loss of potency rather than development of off flavor or taste. All samples were considered satisfactorily edible. The loss in taste and flavor was unrelated to residual peroxidase activity. Samples with no peroxidase activity showed as much loss in taste and flavor as samples with a peroxidase activity score of 3 by the guaiacol test or of 5 by the benzidine test.

In still another experiment, 22 samples of commercially dehydrated potato strips were stored at room temperature for one year and then examined for flavor and color after reconstitution. Tests in this Laboratory after a year of storage in hermetically sealed cans indicated a range in peroxidase activity scores of 0 to 10 and a moisture range of 5.7 to 9.3 percent. It was clear from evaluations that there was no significant correlation between re-

Maintenance time reduced to a minimum

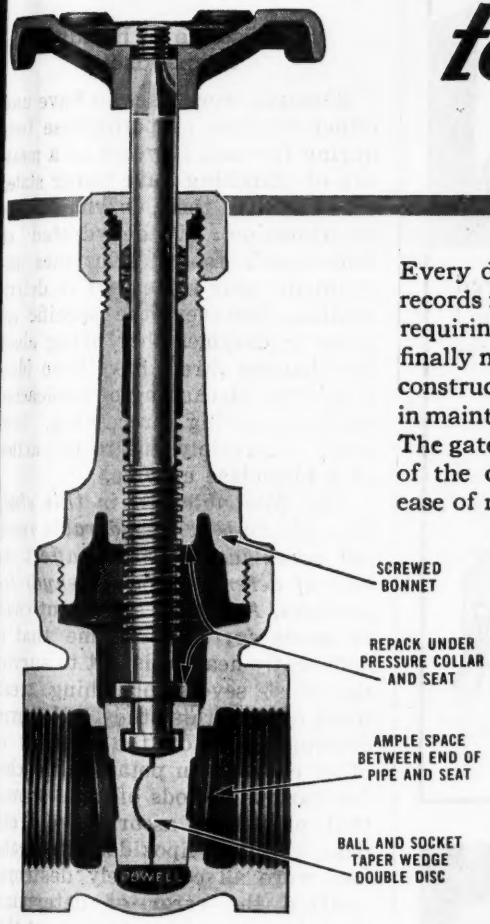
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Fig. 500
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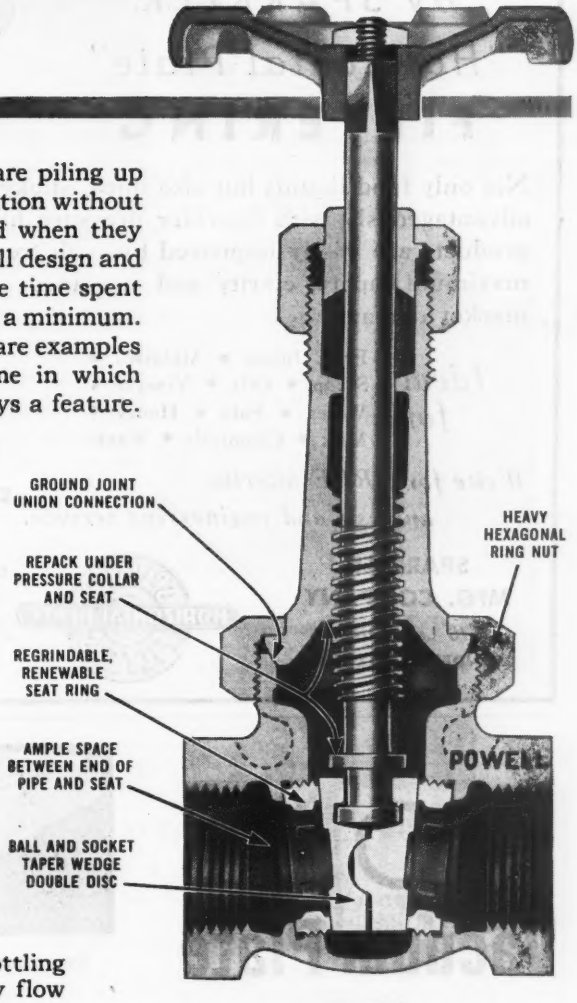
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Fig. 1375
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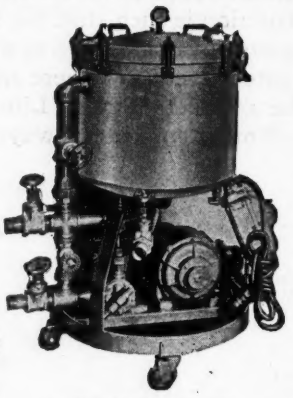

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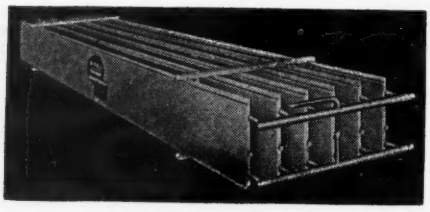

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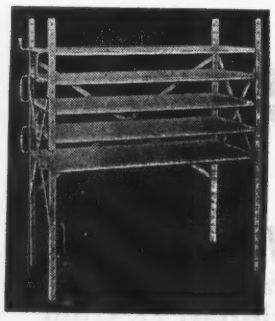

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sidual peroxidase activity and scores for flavor and color. Variations in quality were not found to be correlated with moisture content of these samples.

Significance of Residual Peroxidase

Research workers who have used either catalase or peroxidase tests during the past 10 years as a measure of blanching have never stated that either of these enzymes causes deterioration of dehydrated or frozen-pack foods. Enzymes undoubtedly play some part in deterioration; however, the specific enzyme or enzymes that bring about the changes rarely have been identified. The blackening of unbleached potatoes during processing, however, is certainly due to the action of a phenolase enzyme.

The data obtained in this study have shown that considerable residual peroxidase does not affect the rate of deterioration of dehydrated potatoes. A similar statement could be made for any enzyme that is sufficiently heat-resistant to survive the least severe blanching treatment used in this study. However, determination of the activity of other enzymes in potatoes blanched for various periods of time showed that phenolase, ascorbic acid oxidase, carotene lipoxidase and catalase were all completely destroyed (within the error of determination) by a blanching treatment that reduced the peroxidase activity score only to about 30. Therefore, since these enzymes were not present, even in the sample blanched 1 minute, we do not know whether residual amounts of these enzymes would accelerate the deterioration of dehydrated potatoes.

Since peroxidase requires the presence of peroxides to be active and since peroxides are formed normally by other enzymes, it would hardly be expected that peroxidase could cause deterioration in the absence of peroxide-producing enzymes.[1] The storage data are thus consistent with the observation that most, if not all, of the other enzymes in potatoes are destroyed by a very short blanching treatment thus making peroxidase latent. Residual peroxidase is significant because it may be used to indicate the approximate amount of blanching that dehydrated potatoes have

[1] In preliminary experiments with chemical and enzymic methods of detecting peroxides, no peroxide was found to have accumulated by chemical oxidation in potatoes blanched sufficiently to give a negative peroxidase test and stored for several months at 90° F.

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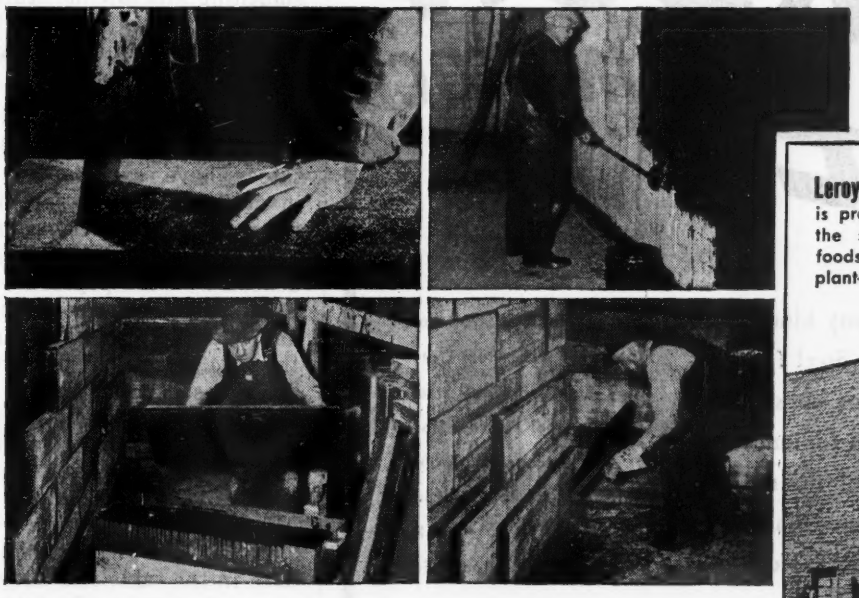

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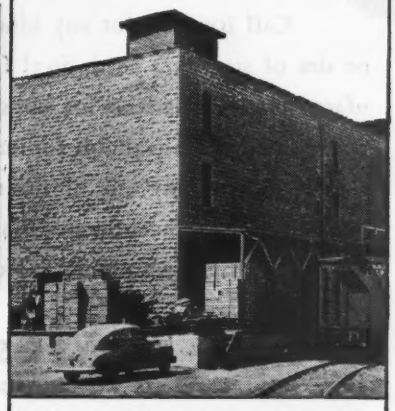

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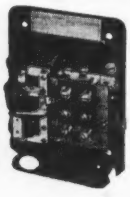

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received during preparation. *Since the peroxidase itself did not cause deterioration, the peroxidase test is necessarily an empirical one.* Proper blanching and low moisture content are the two most important requirements for stability during storage and transportation.

"Popcorn" Effect

Manufacturers of dehydrated potatoes have experienced difficulty in meeting specifications in regard to peroxidase inactivation on the one hand and overblanching, as evidenced by the "popcorn" effect, on the other. Overblanching, which has been noticed particularly with the 1943 crop of potatoes, is no doubt associated with the character of the raw material, since under exactly the same blanching and drying conditions different lots of potatoes vary markedly in their tendency to form the "popcorn" pieces. This is illustrated in Table VI. The data in the table also show the relation of "popcorn" formation to blanching time. The effect is so severe with some lots of potatoes that it would seem advisable to avoid their use for dehydration purposes.

The tendency to form "popcorn" appears to be associated with mealiness. In this connection, the work of Freeman on the factors responsible for mealiness and waxiness in cooked potatoes is pertinent.[1] He aptly describes the condition known to the dehydration industry as the popcorn effect, observing that when mealy tissue of baked potatoes was dried it formed a very porous mass, but when waxy tissue was dried it became dense and horny in nature. He states that "repeated observations have shown that the dried porous tissue came from the mealy portion of the baked tubers, while the dried, vitreous, nonporous substance came from the waxy or soggy samples." We believe that these observations apply almost directly to potatoes prepared by the usual blanching procedure as well as by baking, and therefore that mealiness is associated with the "popcorn" effect.

Acknowledgment

The authors wish to thank L. B. Howard for suggestions and the following other members of the staff of this Laboratory for assistance: Martha E. Davis, Margery Doerr, Dorothy B. Hallmeyer, P. W. Kilpatrick, L. R. Leinbach and M. F. Pool.

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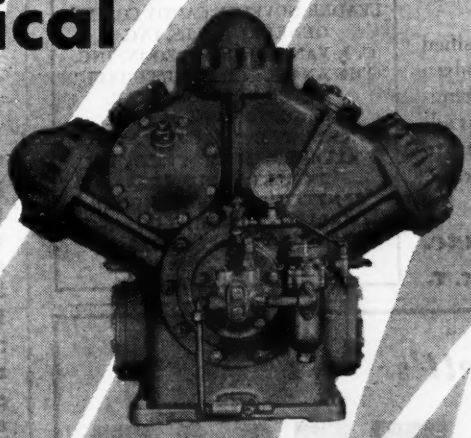

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2. D. D. Paterson, "Statistical Technique in Agriculture Research," McGraw-Hill Book Co., New York, 1929. Table of *t* values, p. 248.
3. J. Sugihara and W. V. Cruess, Rapidly Refreshing Dehydrated Vegetables, Fruit Products Journal, vol. 21, 239-240, 1942.

Packaged Foods

(*Continued from page* 82)

that little consumer research was done on food packages before the war, or since. However, a great deal of redesigning is now under way. Food manufacturers should entrust this work to individuals who have knowledge of consumer and marketing needs, food uses and differentials, and other background necessary to improve the design and functional use.

What Is Needed

The tendency often exists on the part of some management men to credit the individual designer or packaging engineer with a background that is seldom found in either group—real consumer or market analysis experience. Truly market-minded management is not penny wise and dollar fooled. Some manufacturers lean too heavily on the food chemist or home economist for solutions requiring the services of other specialists in creative and marketing phases. Obviously, designers, packaging manufacturers and their sales engineers alone cannot evaluate and solve all of the consumer and marketing problems involved in improving many food packages. Chemists, chemical engineers and others experienced in food research and merchandising should be consulted more frequently.

What is needed in these instances is someone to analyze and coordinate all information, then collaborate with technical and professional experts, thus achieving a well-rounded, factual basis on which to work. Top management is usually too busy for this analytical task. Otherwise the problem becomes too technical and worrisome to the business executive, and he does very little about it, trusting to the sales force and "good luck" for continued sales volume.

Strong or weak as your product and package may be, this analysis and coordinated teamwork is needed to sift out those "little things" before the "buyer's market" arrives. At the marketing end, you will find that improved products and packages have paid and will continue to pay big dividends.